

परि पुरातत्त्व परिभाषा

Number 36

2005-2006



Sanauli: Excavation in progress



Sanauli: Antennae Sword



Sanauli: Skeleton with gold bangles



Sanauli: Grave with Carnelian beads



Sanauli: Pot with stannite inlay decoration

परिच्छ
पुरातत्त्व
PURĀTATVA

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BULLETIN OF THE INDIAN ARCHAEOLOGICAL SOCIETY



Editor

K. N. DIKSHIT

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PURĀTATTVA

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Editorial

The Indian Archaeological Society, a non-governmental voluntary organisation, of 40 years standing, provides a forum to the young and senior archaeologists of the country and also of other countries to present freely and frankly the results of their field-work and opinions thereupon. Most of them come from the Archaeological Survey of India as well as Archaeological departments of the State Governments, Universities and Research Institutes. They have worked hard to explore and excavate buried sites practically in every part of the country. The Survey has, of course the largest infrastructure for this purpose. The budget is equally huge and so is the manpower. Unfortunately, in spite of these, the absence of professional leadership in the ASI since 1993, could not provide a futuristic vision to Indian archaeology. We have reached a situation where one has to try to salvage the reputation of Indian archaeology once enjoyed in archaeological researches and conservation of monuments. As pointed out in the editorial pages of last year's *Purātattva*, No. 35, we can merely attempt to draw attention of the authorities again and again to the fact that the post of Director General of the Archaeological Survey of India be filled-up by open selection conducted by the UPSC which has not been done so far. The matter was raised again by a resolution in the meeting of the Central Advisory Board of Archaeology held on 2nd August 2006, under the Chairpersonship of the Minister of Culture, Shrimati Ambika Soni, but the Government of India evaded direct answer. The only reply was that there is no one in ASI who could be promoted to the post of Director General. The matter was clarified in the Board meeting that no professional Director General was ever appointed *through the channel of promotion* all were selected through UPSC under direct recruitment rules like Sh. A. Ghosh (1954), Prof. B.B. Lal (1968), Sh. M.N. Deshpande (1972), Sh. B.K. Thapar (1977), and Mrs. Debala Mitra (1979). The same is true of most of the States where IAS officers, knowing nothing of archaeology, are heading the archaeology departments. This clearly shows that both the Govt. of India and the State Governments do not bother about the matter and the statement continues.

This issue of *Purātattva* is released in honour of Sh. M.N. Deshpande, retired Director General, Archeological Survey of India, who has dedicated his whole life to the cause of archaeology

stimulating new thinking and understanding the problems of conservation of built heritage. The members of the Society take this opportunity to felicitate him and wish him good health and long life. The Archaeological Survey of India, responsible for managing the Centrally protected monuments, under his energetic leadership encouraged scientific collaboration with leading institutions of the country and also international organisations for the conservation of Ajanta, Taj, Jagannath temple, etc. which provided, in the long run, a firm base to the Indian expertise in conservation of monuments.

The recently held "Summer School" at IIT, Kanpur, helped young archaeologists in sensitising and application programmes in the scientific trends in archaeology. As a sequel to this, a proposal on terrain mapping and archaeo-scientific studies of Ahichchhatra has been formulated by the ASI and IIT (Kanpur) in collaboration with Allahabad University. The archaeologists of other institutions in India may also avail this opportunity by contacting these agencies.

The State Directorate of Archaeology and Museums, Andhra Pradesh in collaboration with India – ICOMOS organized a two-day seminar on 'Conservation Policy of Heritage Monuments and Sites and Cultural Tourism' on 8-9, July 2006 at Hyderabad. With the changed circumstances in the 21st century, public awareness has brought about tremendous rethinking in the conservation policy relating to heritage monuments and sites. It is important to identify, record and protect our built heritage. The purpose of the listing of heritage buildings, precincts and open spaces is to identify certain categories of buildings which may or may not be even 100 years old and to ensure that their architectural and historical value is fully taken into account in decisions effecting their future. For those which may not survive, we should at least make them available for historical research before they completely disappear.

The Society is grateful to the Govt. of Madhya Pradesh which felicitated Dr. S.P. Gupta, the General Secretary of the Society, by conferring on him the first 'V.S. Wakankar National Award' in summer this year.

The present issue of *Purātattva* carries articles from prehistory to mediaeval archaeology, including archaeological theory, and also notes and news on excavations and explorations conducted by different institutions of the country, viz. Archaeological Survey of India, Indian Universities, State Departments of Archaeology and Museums and also research institutions. Further excavations at Bhirrana provided evidence for the better understanding of the pre-Early Harappan phase, sometimes called 'Hakra', of the Indus-Saraswati Civilization which continued through mature to late Harappan phase in Gujarat and Uttar Pradesh in its regional manifestations. Mention may also be made about the epoch-making discovery of as many as 116 graves at Sanauli, a Harappan necropolis in the upper Ganga-Yamuna doab, which has established the association of 'Copper Hoard antennae sword' with

a Harappan cemetery. However, a word of caution is needed here for the scholars working in the field of South Asian Archeology. The Harappan Civilization may not be termed as Indus Civilization or Indus Valley Civilization any more as the presence of this culture at larger number of sites in the Saraswati basin than the Indus valley demands. The ground realities do favour the term 'Indus-Saraswati Civilization'. An article on the Saraswati prepared by the scientists of ISRO, Jodhpur, using latest high resolution satellite imageries, has revealed data on the entire course of the river from the Siwaliks to the Rann of Kutch, and also the Harappan sites located on it.

The Indian Archaeological Society is not responsible for the views expressed by the contributors of the articles, notes and reviews published in this volume. However, we are indeed grateful to all the scholars who have contributed their research papers to this issue.

Dr. S.P. Gupta has always been a source of great encouragement to the editorial team. He also went through practically all the articles and gave necessary editorial guidance in bringing out this issue of the Bulletin. A team of young scholars from the Indian Archaeological Society, namely S/Shri S. Vijayakumar and Suresh Bomble have gone through the texts of the articles and helped the press at different stages of their publication. Shri Pranab Jyoti Sarma, Dr. (Ms.) Mukta Raut-Dey and Sri Mohit Srivastava coordinated with them in achieving the defined task. Other members of the Society, S/Shri Rakesh Dutta, Lakhan Trivedi, J.N. Khara, Bharat Singh and Ms. Raj Rani Sharma, have equally helped us. Shri Jassu Ram improved upon many line-drawings and maps. Shri Madneshwar Trivedi, our Director Administration provided all the logistic support. In our last issue of *Paritattava*, Number 35, 2004-2005, we had wrongly mentioned the place of birth of Prof. A.K. Narain, founder of the Indian Archaeological Society, as Uttar Pradesh. Prof. Narain informs us that he was born at Gaya in Bihar. We regret the mistake.

The IAS undertook an exploration project approved by the Archaeological Survey of India and Sh. S. Vijayakumar, our Research Associate surveyed that part of the Kerala Coast which was once associated with Muziris.

We deeply mourn the sad demise of Dr. N.R. Banerjee, Director, National Museum, New Delhi, Prof. B.N. Srivastava former head of the Department of Ancient Indian History, Culture and Archaeology, Lucknow University, and Dr. R.C. Sharma, former Director General, National Museum, New Delhi who breathed their last at Lucknow and Varanasi, respectively. We also mourn the demise of Prof. P.C. Pant of Banaras Hindu University, who died at Lucknow.

Thanks are also due to Ms. Anita Mehta of Aquarelle, Ms. Swaraj Davra and members of their staff for ensuring the quality of the publication and bringing out this issue in time in spite of undue delay from our side.

KND



Shri. M. N. Deshpande

Felicitations to Shri M.N. Deshpande

Retd. Director General, ASI

Shri M.N. Deshpande was born on the 5th of November, 1920 in Rahimatpur village of Satara district in Maharashtra. After initial years of schooling in Rahimatpur itself, he went to Pune and graduated from Fergusson College with First Class (Honors) in the discipline of Ardha Magadhi, the language in which most of the early Jain literature was written. He was also awarded the S.A.T. Jain Literature Scholarship. He had the opportunity to study under the guidance of Prof. H.D. Sankalia and conducted research on the Cultural History of India based on Jain Canonical literature and archaeology.

In 1944, he was selected for Training in Field-Archaeology by Sir Mortimer Wheeler in the School of Archaeology at Taxila. After this he was selected as an officer in the Archaeological Survey in 1946. He joined as an Assistant Superintendent and retired as the Director General in 1978. The significant

research and excavation initiatives that he pursued during his career as an archaeologist are as follows:

As a young archaeologist, his skill and commitment in the field of conservation of monuments is reflected in one of the first major tasks that he undertook. This was the repair of the Gol Gumbad tomb built by the Adil Shahi rulers of Bijapur, Karnataka. This monument needed special repairs to restore its famous acoustic elements.

His specialization in the field of rock-cut monuments of western India is reflected in the numerous efforts of research and excavations that he undertook at various caves namely Pitalkhora, Bhaja, Ajanta and Ellora. At Pitalkhora he discovered innumerable sculptures, including the famous *Yaksha* figure as well as many inscriptions and crystal objects. He wrote a comprehensive article on the 'Rock-Cut Caves of Pitalkhora in the Deccan' in the journal, *Ancient India*, No. 15, 1959. His work at Ajanta led him to co-author the book *Ajanta Murals* published by the ASI in 1967. He spent years studying these caves with tremendous zeal and gave direction to the conservation of these caves and their paintings. At Bhaja he was the first to notice the inscription on the wooden ribs of the ceiling of the main *chaitya*.

His training in Field Archaeology helped him to undertake explorations which led to the discovery of several chalcolithic sites in Maharashtra, such as Nevasa, Bahal, and Tekwada. His excavations at Daimabad in 1959 pushed back the antiquity of the chalcolithic culture in Maharashtra to the early 2nd millennium BC. His excavations at Tamruk in West Bengal led to the discovery of several uniquely beautiful works of terracotta art.

He presented the landmark paper on the 'Roman Influence on Satavahana Terracottas' at the *Congress International D'e Archaeologie Classique* held in Paris in 1965. This paper was based on intensive study of the Ter Terracottas in the collection of Shri Ramalingappa Lamture. He had noticed the influence of Roman technique in these terracottas as well as identified some pieces of terracottas of Roman origin.

An exploration close to his heart was the one he had led in Lahul and Spiti Valley in 1965, where he discovered mural paintings at the Buddhist monasteries at Tabo. He described these as the 'Himalayan Ajanta' as they display a remarkable influence of the Ajanta tradition. He discussed them at length in his paper 'Buddhist Art of Ajanta and Tabo', which was also delivered as a set of lectures and published by the Namgyal Institute of Tibetology as a special number in their *Bulletin of Tibetology* in 1973.

As mentioned above one of the key areas of his contribution has been in the field of Conservation of monuments. To cite a few more examples – the preservation of murals at Ajanta began under his guidance; he led the team of Indian conservationists invited to repair the famous Buddhist Grottoes of Bamiyan in Afghanistan; he was instrumental in conservation efforts at the Konark and Puri temples

in Orissa; After the severe earthquake at Latur he was part of the committee formed to survey the impact of this natural disaster on monuments and suggest measures for their conservation and repairs.

During his tenure as Director General he made vigorous efforts to check the smuggling of art objects out of the country, culminating in the enactment of the Registration of Antiquities and Art Treasure Act, 1972. Under a revived publication programme he brought out many delayed numbers of 'Indian Archaeology – A Review'.

He has had the opportunity to travel widely in different parts of the world to study archaeological sites, guide conservation efforts, deliver lectures at universities. Some of the countries he visited are – France, Greece, UK, USA, Cuba, Egypt, Iran, Afghanistan, Nepal, Sri Lanka, China and Vietnam.

Even after his retirement he was entrusted with the directorship of the Research Project entitled Technological and Archaeological Studies of the western Indian Caves, at the Nehru Centre in Mumbai. During that period he pursued his long awaited interest to explore and study the rock-cut caves at Panhale Kaji in the Konkan region which threw a flood of light on the religious and cultural history of Maharashtra, especially on the Buddhist rock-cut activity during its early phase as well as the ascendancy of Vajrayana at cave centers like Ellora and Kanheri. However, he found that, the Panhale Caves are of singular importance as they specialize in the worship of Akshobhya – one of the five *Dhyani* Buddhas of the Vajrayana pantheon. In fact in one of the caves the image of *Mahacandarasana*, a very fierce deity of the Akshobhya family, was found by him. This place was also important as a centre of *Natha Sampradaya*. One of the caves contains sculptural representation of the 84 *Natha Siddhas*, a feature not to be met with elsewhere in India. This study was published by the ASI in 1986 as a book *The Caves of Panhale Kaji*.

He was the advisor for the *Aditi*: Festival of India at USA as an advisor.

A memorable study-cum-lecture tour was to the Dunhuang Caves of China where he was invited in 1994.

It is important that we mention that Shri Deshpande is one of the disciples of the late Shri Gurudev Ranade and continues to endeavour to follow his path.

As a young boy growing up Shri Deshpande had witnessed his father deeply involved with the Freedom Movement. This process had instilled in him the Gandhian principles. In fact, he had the opportunity to stay for few days with Gandhiji in Pune after Gandhiji was released from jail for the last time. Other satyagrahis were still not released and, therefore, Shri Deshpande who was just a young student volunteer of Seva Dal got this humble chance.

INDIAN ARCHAEOLOGICAL SOCIETY

Archaeological Theory: A Perspective from Outside the Western Academy*

NAVANJOT LAHIRI**

"We need to move away from global narratives not because they necessarily *always* swallow up complexity, but because they historically have done so, and once we have focused on these submerged stories and perspectives, the entire structure appears transformed." (Ania Loomba 1998).

Historically speaking, global narratives exist in a variety of forms and are known to telescope vast terrains and timescales into deceptively simple and formulaic frameworks. More recently, the forms that such narratives take, in as much as they have either subordinated or suppressed histories on the margins, have begun to be carefully examined and analysed. This itself is largely a consequence of the 'margins' making their presence felt, of marginal subjects and sites proactively articulating their voices in distinctive ways. While this has not led to the demise of global narratives, at the very least, these are now being read very differently.

This presentation will attempt to examine some such narratives in the discipline of archaeology. These relate to

theoretical debates about its methods and models as also those concerning the history of the discipline itself. There is a vast literature on theoretical archaeology in which productive rethinking and research jostle with aggressive posturing and polemics. This paper will not provide a summary of its range and the debates it has generated. Instead, I will set a few issues as they appear in the writings of First World archaeologists, alongside archaeology as it was and continues to be practiced outside that world, in order to throw into relief the level of engagement with such archaeology within these writings.

The diversity of local narratives has always been present for all those who cared to look. Their visibility, though, has greatly increased as archaeologists and scholars who work and frequently live in the contexts in which they have emerged, highlight the problems that these narratives pose when they are juxtaposed with larger global narratives. J.R. Pagan-Jimenez's suggestion, made in relation to Latin America, that instead of importing forms of theorization from the "usual production centers we need to open new, dialectical and parallel channels of communication to

* This is largely based on a presentation made at an international training workshop in Rabat, Morocco, in June 2005. The author was the convener of the workshop and its theme was "Using Material Culture And Archaeological Sources as Alternative History" (sponsored by the Council for the Development of Social Science Research in Africa [CODESRIA] and South-South Exchange Program for Research on the History of Development [SEPHIS]).

** Department of History, University of Delhi.

articulate more balanced characterizations of the world's archaeological practices" (2004:200) is one recent articulation of this problem. This hints at what Dilip Chakrabarti, frankly articulated in the context of South Asia, when he said that "what the Third World archaeologists must also not forget is that, when the Western archaeologists work in areas like India, most of them do it, not in terms of the archaeological tradition of the land they have gone to but in terms of the Euro-American tradition which has accumulated in relation to that land" (2003:222). Such sentiments are also reflected in Ian Hodder's review (2001:2) of contemporary theoretical debates in archaeology when he acknowledges that "the critique from other voices and from multiple non-western interests has often forced theoretical debate". A similar understanding can be seen even more strongly in those texts where, unlike the above mentioned work of Hodder, contributions have been sought from indigenous archaeologists. Tim Murray's admission in the 'Introduction' to the multi-volume *Encyclopedia of Archaeology* ('History and Discoveries') (2001: xx) is worth citing in this regard. He quite frankly talks about "the tensions between local and global archaeologies revealed by the entries in these volumes" which, as he puts it, appear to be "a true reflection of the experience of many contemporary archaeologists, and they pose a challenge to the discipline in future decades". Generally speaking, what Murray describes as "global archaeologies" are writings bearing the stamp of the Anglo-American world, which happen to occupy centre-stage in discussions on theoretical archaeology. In effect, what this means is that those who wish to understand 'archaeological theory' read up what a handful of critics who constitute a kind of brand name, have to say about it.

In any discipline, a preoccupation with 'brand ambassadors' is detrimental to creatively thinking about the field itself. In the domain of archaeological theory, the situation is made somewhat worse by the fact that the universality in which the writings of global 'brand ambassadors' are couched, rarely incorporates an awareness of historical difference. Therefore, from my own perspective, that of someone who lives and works outside the First World, a crucial concern would be to explore and

explain the kinds of theoretical issues that have structured archaeological research in nations like my own and the reasons why these are and will continue to be different from the 'archaeological theory' that has emanated from the Western academy.

But, first, what is the working definition of 'archaeological theory' that is used in this paper? Archaeological theory is used here as a kind of umbrella term that encompasses a plethora of theoretical concepts through which we make sense of material traces (or 'facts') so as to understand and explain patterned behaviour in the human past. Such concepts are themselves abstractions and constructions that are produced as material remains are studied and they, in turn, guide the interpretation of archaeological finds in order to construct knowledge about and changes in the character of past societies. Since ways of examining the past are shaped by the practices of their own times, theoretical approaches continue to evolve and change.

It has sometimes been assumed that older ways of doing archaeology were untheoretical because they primarily concerned themselves with empirical examination of specific archaeological data while those that are more recent are theoretical because they approach the discipline of archaeology and the past in more self-conscious and deliberate ways. This is a misrepresentation. The older traditional studies were also theoretical in the sense that they too rested on larger assumptions to better understand and organize the material paraphernalia of those human cultures of the past that they aimed to study. The establishment of the discipline in the nineteenth century in Europe was, in fact, predicated upon the enunciation and acceptance of certain key theoretical concepts.

In the case of Europe, this has been seen as a product of two distinct ways of thinking which are too well known to be discussed in any detail here (see Bahn and Renfrew 1991:22-23; also Daniel 1962: chapter 2). The first originated in Scandinavia and involved a system of classifying artefacts and assigning them relative dates without recourse to written records. C.J. Thomsen, a Danish

scholar, evolved the 'Three Age System' in order to catalogue and prepare for exhibition a large collection of antiquities that had been amassed by the Danish Royal Commission for the Preservation and Collection of Antiquities, which had been set up in 1807. This has been described as archaeology's 'First Paradigm' because through it, typological thinking and the idea that a directional pattern in the past could be discovered from artefactual analysis, came to be established. The other stream of thought through which archaeology in Europe developed was the establishment of the concept that all living beings underwent natural processes of change. The most important archaeological research which established this principle and the idea that the antiquity of humankind went back to a period much earlier than 4004 BC, the date suggested by biblical calculations, was by Jacques Boucher de Perthes and his ideas could be dovetailed very easily with the findings of Charles Darwin whose *Origin of Species*, published in 1859, which demonstrated the principle of biological evolution. In any case, in the second half of the nineteenth century, a dynamic view of living things came to replace a static church-based paradigm.

Let us briefly pause to ponder over the conditions within which such theoretical ideas emerged and the interest that they generated in Europe. In England and Denmark, these formed part of longer traditions of research that were locally grounded and conditioned by the specific socio-political conjunctures of their nation states. An enunciation of these dimensions in the development of Thomsen's scheme in Denmark has been articulated out at length (Kristiansen 1981: 20-25). Much of the archaeological finds that were classified by C.J. Thomsen had come to light because of agrarian reforms and expansion that converted strip agricultural holdings into compact ones. The landscape transformation that this entailed resulted in graves and hoard objects being uncovered in unprecedented quantities even as their contextual settings were destroyed. The Royal Commission for the Preservation of Antiquities was founded in 1807 in response to this situation and what they collected came to be housed in Copenhagen's National Museum. The prefix 'Royal' to this commission was an

indicator of how the nation state and its administration came to be seen as guardian of the historical heritage of Denmark. Simultaneously, prehistoric monuments were viewed through the prism of nationalist pride and sentiments. As one member of the commission put it, "they remind us about the heroic deeds of the Scandinavian, they speak loud about his strength and giant force, they offer a rich opportunity to compare the past and the present" (Thorlacius, quoted in Kristiansen 1981:22).

In Britain, an interest in searching out and studying what we today recognize to be prehistoric antiquities goes back to the seventeenth century. Dugdale's (1650) declaration that the stone tools were "weapons used by the Britons before the art of making arms of brass or iron was known"; Charles Lyttelton's paper on stone hatchets read to the Society of Antiquaries of London in the 1770s; Conyer's find of a stone axe with what he thought was elephant bones in London in 1715; John Frere's letter enclosing some flint implements found at Hoxne in Suffolk where he noted that the "situation in which these weapons were found may tempt us to refer them to a very remote period indeed, even beyond that of the present world"—all these ideas and discoveries as also the existence of forums for examining and debating them form part of a long tradition of antiquarian interest and significantly predate the acceptance of stone tools as evidence of a remote human past. It was in such forums as the Royal Society and the Society of Antiquaries that in 1859 two English scientists, Joseph Prestwich and John Evans, publicly corroborated Perthes's ground-breaking discovery in the Somme river valley. One year later, Charles Darwin's theory of evolution was also actively debated at such forums, as for instance, at the meeting of the British Association for the Advancement of Science held at Oxford University. More than anything else, such pronouncements and debates attest to a larger intellectual interest that existed in the public domain about such issues.

Instead of further examining the ideas of nineteenth century European archaeology, let us now pose a related question: did archaeological research in the nineteenth

century in other parts of the world emerge from a similar background? Was it marked by the deployment of the ideas that have been discussed above—ranging from typological models like the Three Age system to evolutionary thinking—which were then current in parts of Europe? Generally speaking, what emerges from the details of the histories of archaeology in many parts of the world is the fact that there was no simple transfer of ideas. Even in those situations where such ideas became important, they were considerably modified by the prevalent regional research traditions.

New Zealand seems to clearly exemplify this. There, it would seem that the latter part of the nineteenth century, marked by a concern to associate extinct mammals with human remains, was influenced by European developments (Allen 2001). This impact can be clearly seen in the work of the German-trained geologist Julius von Haast (1872) concerning the presence of giant extinct ostrich-like birds (the giant ratite *Dinornithiformes*), or moa, in New Zealand where he assumed that the remains from sites in South Island were of Pleistocene age and that moas had finally been exterminated by a Palaeolithic race who used only chipped stone implements.

At the same time, there was a qualitative difference in that, unlike England and France where prehistoric archaeology was at the forefront of pushing away and invalidating existing paradigms generated by biblical calculations about the chronology of human origins and development, such research in New Zealand was invariably framed by the older natural history approach prevalent there, concerning aboriginal peoples and their putative links. Haast initially identified the moa's exploiters with the Australian Aborigines but later saw them as having originated in Polynesia (a European term for the many islands of 'Great South Sea'). These moa hunters, for him, were not the ancestors of the Neolithic Maori, since their implements were different. Alexander McKay challenged these views in 1874 who noted that polished stone implements, of a kind similar to that of the Maori, occurred with moa bones at Mōubone Point Cave near Christchurch. He, in fact, suggested that the first impact of the Maori

after their arrival was the extermination of the moa. In any case, whichever way one looks at such research, prehistory in New Zealand was not being approached through a model of cultural evolution, which was the hallmark of research that was current in Europe. Instead, it was one in which changes in culture were interpreted as the result of racial replacement.

The different trajectories in the development of theoretical approaches to archaeology in the nineteenth century can be further explored by looking at India. From the perspective of the Indian subcontinent, it would seem that there ought to have been some kind of replication since, archaeology was a European discipline which was established by Europeans who formed part of a ruling elite, as India came to be colonized and ruled by a European power. Interestingly enough, however, it was this very coupling of colonial governance and the establishment of archaeology which created conditions for the unfolding of a markedly different developmental trajectory.

The nineteenth century was certainly marked by a systematic curiosity over the material remains of India's past, and the publications of accounts and findings resulting from it, but this was intimately connected with the needs of British rule—the empire's need to gather and order information on its newly acquired territories. So, it was not a case of scholars and elites searching out the pasts of their own countries as in Europe. Rather, it was a new ruling class of Europeans who were 'discovering' the unknown pasts of subjugated people in unknown lands. While there was certainly a strong element of intellectual interest in the European discovery of India's material past, its recovery and reconstruction was necessary for understanding and ruling her better. In this, the dominant interest of the day was in the field of languages and law, a knowledge of both of which was needed for political control of the land and for the conversion of its people to Christianity. Naturally, archaeological research was also simultaneously deployed to throw light on 'textual' India. This helps us to understand why those Europeans who pioneered the shift from antiquarianism to archaeology in

nineteenth century India were not primarily or even deeply concerned with evolutionary principles or prehistory.

Archaeology, instead, was dominated by field discoveries related to historical sites which went hand in hand with the study of ancient texts, inscriptions, and coins (Singh 2004:21-22). The primary theoretical focus of such work was to use archaeology to provide a grass roots image of ancient India as it appeared in textual sources. The career of Alexander Cunningham who became the director general of the Archaeological Survey of India in the latter part of the nineteenth century, clearly exemplifies these theoretical moorings. Cunningham's approach has been described as "a new route to India's ancient past—an archaeological rather than a literary one" primarily because from 1839 onwards till he retired in 1885, it was the ground level identification of ancient places which was to be an issue of abiding interest for him. Still, inasmuch as it remained rooted in the literary accounts of Chinese Buddhist pilgrims and Classical writers, it almost exclusively illuminated an 'India' which, in terms of a specific time frame, existed within literary parameters. There was neither an interest in nor an attempt to push back the frontiers of India's archaeological past towards discovering those cultures that antedated the historical period, of the kind that formed the core of theoretical developments in his own native land.

This does not mean that the prehistoric and protohistoric roots of India remained unexplored in the nineteenth century. On the contrary, a geologist called Robert Bruce Foote had simultaneously discovered palaeoliths in peninsular India and understood the significance of his discoveries as early as 1863. That this was so soon after the acceptance of the early antiquity of humanity in England in 1859 is no surprise because he appears to have been decidedly inspired by prehistoric discoveries in Europe. Many others—H.P. LeMesurier, T. Oldham, W.T. Blanford, W. King, to name just a few—also made similar discoveries in different parts of India. By the 1870s, because of their work, all kinds of lithic industries along with an interest in stratigraphy, faunal associations and functional usages were brought into focus. For this

reason, Chakrabarti's *tour de force* on Indian archaeology (1988:208) has described the second half of the nineteenth century as a "glorious period in Indian prehistoric research". At the same time, while appreciating the theoretical concerns and scholarship of Foote and other pioneers of his time, what has not been adequately highlighted is the fact that at no point of time, did this form part of mainstream archaeology. These men who pioneered prehistory were mainly geologists connected with the Geological Survey of India and remained unconnected with the Archaeological Survey, the institutional guardian of archaeology and monuments in India. There are no references to such discoveries in the works of those who self-consciously practised archaeology. Cunningham's own reports of his surveys which were being done around the same time period when many of the above mentioned discoveries were unfolding are a telling reminder of this.

Curiously enough, Cunningham himself is known to have discovered sites which we now recognize as being of protohistoric significance but which, because of the theoretical framework within which he worked, were (mis)taken to be historical in nature. A well known example of this is his assessment of Harappa, now recognized to be one of the most famous cities of the chalcolithic Indus civilization. In the wake of his excavations there in 1872, he provided a fairly precise account of its mounds and of objects that we now commonly recognize as Harappan artefacts, including some that are 'type fossils' or archetypal objects of the civilization—an inscribed, rectangular stone seal and flint implements. There is a sense in his report that he had encountered features unlike those that he had usually seen at subcontinental sites. The engraved seal, for instance, was in a script that he had not seen anywhere else in India. Also, the fact that humble pottery and flint implements were illustrated by him, an aberration in terms of the general character of his reports, indicates that Harappa intrigued him. However, instead of building upon the peculiar nature of such remains, in his interpretation of Harappa, he fell back on familiar textual territory where he sought to identify Harappa with a city that was mentioned in the seventh century AD account of Hsuan Tsang, the

Chinese pilgrim who had visited it. But, as we know today, this was a city of one of the first Bronze Age civilizations of the Old World, a city that existed before those of the ancient world of written history. Its antiquity remained unknown, though, because it could not have been realized by those like Cunningham who were always in the company of Buddhist pilgrims from China.

Many more examples can be cited, but enough has been said to demonstrate that nineteenth century archaeology in India did not grow up under the influence of the new theoretical developments that were taking place in Western Europe. Because of this, an archaeologist like Cunningham appears to have been unable to push the boundaries of what he had excavated beyond his own theoretical scheme, one which was marked by an obsession with the need to archaeologically verify literary places. This scheme, as has been pointed out earlier, was integrally related to other branches of Orientalist inquiry which were heavily dependent upon textual sources and whose promotion was important in the larger task of the British governance of India. Another reason for the 'cocooning of Indian archaeology from Western influences', according to Singh (2004:340) concerns the institutional form within which archaeology developed. Unlike England, archaeology became a government department here, one which relied on civil and military officers of the colonial state for whom archaeology was often an ancillary, part-time or post-retirement activity. This group of officers does not seem to have much in common, nor any significant degree of contact, with European archaeologists.¹

This institutional texture must also be the reason why unlike England, the average Indian did not regard archaeology as an intellectual pursuit concerned with unraveling the subcontinent's material past. Instead, archaeologists were generally regarded as persons who were part of the government or British *Sarkar*. Also because this was a pursuit that was being promoted by a new and alien state, a very real fear also came to be articulated about archaeological work being a government strategy for encroaching into the religious sphere of the colonized

majority. Such fears were increasingly articulated as religious structures of all kinds came to be documented, measured and studied as part of the archaeological policy of the British *Raj*. For example, the caretakers of the Radha Ballabha temple in Brindaban in north India petitioned the government in 1902 asking whether the plans and photographs of the temple which were being repaired meant that the government wished to make a claim to its title and possession! That such fears were not entirely unfounded is evident from the case of the Mahabodhi temple in Bihar, which stands close to where Siddhartha Gautama, the historical founder of Buddhism, attained enlightenment. Between 1876 and 1884, the British government in India spent 200,000 rupees for the purpose of its architectural restoration. More importantly, they believed that by thus repairing it, they had acquired rights over the shrine. Lord Curzon stated this with more candour than most when he said, that the acts of restoration at Mahabodhi 'seem to involve the gradual assertion of a co-ordinate authority, with power, if not to dispose of the shrine or to expropriate the *Mahant*, at least to superintend his superintendence and to control his control'. Shrine guardians and devotees, therefore, frequently regarded archaeological work as something that historic places had to be protected from lest they altered existing rights.

The only figure in Indian archaeology, as was mentioned earlier, where one can see a meeting ground between European developments and work pursued in India is the geologist-archaeologist, Robert Bruce Foote. At the same time, the issues that he raised in relation to prehistory and the work of other contemporaries who worked in the same field formed part of what is best described as sidelined scholarship. This is because they were never seriously integrated into the overviews of the early Indian past that were published. The tradition of scholarship where prehistory and the work of geologists was consistently ignored, in fact, is an old one in India. Numerous works of this genre can be cited but a particularly glaring example of such slanted scholarship is the first *Cambridge History of India* (Rapson 1921, reprint 1955). Devoted to the history of Ancient India ('from the earliest times to about

the middle of the first century AD"), it began with the invasions of a putative ethnic group—the Aryans—completely passing over the information that had been generated by the prehistoric research of officers of the Geological Survey of British India, as also that of the Archaeological Survey of India. Even the chapter contributed by John Marshall, the Director General of the Archaeological Survey, to Rapson's volume relegated its description of lithic cultures to a couple of paragraphs or so.

Prehistory, however, was not marginal at all in several parts of late nineteenth century–early twentieth century Africa. However, an important theoretical concern which, as in the case of India, appears to be related to the political conditions under which such research flourished, was either to use prehistoric collections as hard evidence for racist, cultural theories or to see local assemblages in terms of European tool typologies. In central Africa, collections of bored stones and fine-ground stone axes carried back by early explorers and continued by administrators and engineers who formed part of French and Belgian colonial structures, became primary evidence for the theories of cultural evolutionists. One of these was "E. Dupont", the head of the Belgian Royal Institute of Natural Sciences. These evolutionists argued that all people throughout the world went through the same stages in the manufacturing of implements and tools, based on the similarity of African stone tools and those found in Europe. They also argued that different people passed from manufacturing stage to manufacturing stage at a faster or slower rate determined by their race, their environment, or both" (McIntosh 2001:23). Generally speaking, the European palaeolithic was seen as anticipating identical or analogous stages elsewhere. In the case of Africa, an example of this was a work published by X. Stainer in 1899 (*L'Âge de la Pierre au Congo*) in which he sought to demonstrate the backwardness of Africans, among other things, by arguing that African prehistory simply replicated (albeit more recently and at a slower pace) the distant past of Europe (McIntosh 2001:24). Political factors also played a crucial role in archaeological investigations in states around the Horn of Africa. For instance, in Ethiopia, from the

nineteenth century, the main theoretical interest was the study of the Ethiopian Christian culture: "on the ancient historical remains in the northern regions, where the cradle of Christian culture was located, and on the medieval rock-hewn churches. Moreover, until recently, the research was heavily affected by a dominant 'paradigm'—mainly south Arabian-origin of Ethiopian civilization, and archaeological evidence was basically used to support that theory."

The most blatant coupling of colonialism and the study of the African past, though, can be seen in the manner in which diffusionary postulates were (mis)used to negate achievements relating to technology, culture and politics. This was done by attributing such accomplishments to diffusion from the north and was generally applied to more recent phases of African prehistory. An idea of the nature of such speculations can be had from the manner in which race, region and culture were sought to be married with each other (Trigger 1989:130):

"In 1880 the German Egyptologist Karl Lepsius suggested that the indigenous peoples of Africa were composed of two major stocks: a lighter skinned Hamitic population in the north and a Negro population to the south. A large number of ethnologists, including Charles Seligman (1930) identified the Hamites as the 'great civilizing force' of black Africa. They sought to account for the more advanced aspect of sub-Saharan cultures by claiming that culturally more creative Hamitic pastoralists had conquered and imposed the rudiments of a more advanced technology and culture, that was ultimately of Near Eastern origin, upon the culturally inert Negro populations of Africa until their own creativity was undermined as a result of 'miscegenation'. This dichotomy between Negroids and Caucasoids, and the accompanying disparagement of African creativity, lingered on in studies of prehistory and ethnology into the 1960s. The role that was assigned to the prehistoric Hamitic conquerors bore a striking resemblance to the civilizing missions that Europeans had been claiming for themselves since the late nineteenth century".

If the theoretical paradigms within which archaeology developed in many parts of the world that had come under direct and indirect colonial rule, were influenced by and yet, were qualitatively different from those in the 'metropolitan' centers, how have they changed in more recent times? What are the research priorities and theoretical perspectives that one encounters among the independent nation states as and when formal colonialism came to be dismantled?

It is difficult to generalize about this but there is certainly one commonality among several post-colonial national traditions in that, as countries came to be unshackled from colonial rule, the particular areas in which research came to be actively pursued, and the theoretical approaches to them, were closely connected with the nature of earlier archaeological practices. Many researchers have pointed this out. For example, Herman Ogoti Kiriaua's assessment (2001:13) regarding archaeology programs in East Africa noted that despite the prominence of that area as a cradle of mankind, it has not been an area of research for local archaeologists. This is because "the early period has been seen as not being controversial and as not having enough to do with the history of the local populace and the definition of nation states. Thus, local archaeologists have been encouraged to concentrate on the later periods in an effort to negate colonial and racist propaganda that only began with the intrusion of the white man". Indigenous archaeological research has, therefore, spawned research that, on the one hand, has argued for local origins for a variety of innovations ranging from food production to invention of iron working techniques and, on the other hand, has shown that coastal archaeology need not been viewed as being related to extraneous factors but was closely linked with developments within the hinterlands.

In the case of French speaking African nations, there has been a debate about whether a better appreciation of the nature of their pasts was possible by breaking away from metropolitan methods and paradigms (those of France in this case). This apparently was the stimulus for a conference of Francophone African and French

archaeologists in May 1978 which resulted in France agreeing to "fund concrete programs to better train African students, to establish cooperative research budgets, to create subventions for scientific and popular publication, and to promulgate rules about the full publication of research results and about the final disposition of artifacts" (McIntosh 2001:33). While many of the promises have apparently been kept, there is still a sense that the most important African demand, "to respect local priorities", remains to be more successfully implemented. These local priorities include "more research on the recent past (counter to the general French passion for the Stone Age), ethnoarchaeology, preservation of historic monuments, help in establishing a basic series of radiocarbon dates, and especially, abandonment of the neoevolutionary stadial (*Neolithique, medieval*) and artifact sequences that ultimately say more about European concepts of prehistory than about African realities."

The question of the relevance and desirability of metropolitan methods and paradigms leads us into the heart of an issue that has been much discussed in relation to archaeological theory and method, about what kind of theoretical approach is best suited to different national situations. For instance, hypothetically speaking, what should be the theoretical moorings of research practices in areas which are still characterized, even by those foreign archaeologists who work there, as neocolonial? An example of this is the Arabian Peninsula where, if we accept what has been said by the Australian archaeologist Daniel Potts (2001), there are few nationals pursuing careers in archaeology since more can be earned through business and through the civil service. Foreign teams dominate archaeology being carried on there and, in turn, they are used as an arm of foreign policy: "the presence of a team from a given foreign country in a particular Arab state is viewed as beneficial by the foreign power, as its presence helps to spread goodwill, heighten awareness of that country, contribute to local heritage interests, and ultimately, sell the products of that country in a foreign market" (Potts 2001:92). Potts himself feels that there is nothing objectionable in foreign teams taking over Arabian

archaeology and compares their situation to that of any other foreign technical specialist (2001:93): "If non-Arabs from the West have the particular expertise needed to investigate the past that is lacking locally, then there is no harm in letting such work be done by them".

What Potts has suggested sounds much like the agenda of 'global warriors' who in another context, without any deep knowledge or interest in the region they target, support and impose (through force and/or funding) systems of governance that are likely to be politically useful to them. The invasion of Iraq is the most recent tragic example of this political approach. Such 'global warriors' in the field of archaeology can be equally dangerous. This is because such people are generally interested in a particular part of the world only to the extent that it helps them answer some of their theoretical queries. They have no interest to understand the archaeology of that part of the world as a whole, nor do they have any respect for its national tradition or scholarship of archaeology. In any case, from the perspective of the countries in the Middle East that Potts discusses, if, as he says, there is hardly any indigenous archaeology, perhaps the first task should be to create national cadres and university departments trained in archaeology, which explore the pasts of their lands sequentially and spatially. Imbibing research designs and hypothesis generated in Western academies and tailoring one's research to either prove or disprove them can hardly be considered a research priority in such situations.

The issue of the relevance and desirability of various kinds of theoretical approaches has been discussed with regard to Indian archaeology as well. The most significant aspect of the post-independence period there has been an exceptionally significant increase in the quantum of archaeological research, which permits us to visualize the basic archaeological history of the land. This has emerged out of surveys and excavations concerned with very basic issues relating to stratigraphy, typology, distribution and dating (Chakrabarti 2003:216). That progress was most rapid in the fields of prehistory and protohistory is not surprising since it was the pasts that antedated the historical

period in the different regions of India, which had remained, relatively neglected during the time of the British Raj.

What appears to be striking, though, is that the cornerstone of Indian archaeological research in the second half of the twentieth century—an approach aimed at reconstructing cultural history in the archaeological sense—was the very one which in U.S.A. and England became the subject of widespread criticism and from which 'New Archaeology' developed. The crux of what was described as a new way of doing archaeology—its focus on explicit reasoning, its analysis of culture as a system made up of several subsystems, its usage of the sciences and concepts derived from geography as also its range of unfamiliar vocabularies which critics dismissed as unnecessary jargon and the gap between programmatic statements and research on the ground—is well known and widely discussed. In the case of India, time and again, the need to use this approach was and continues to be articulated (see Paddayya 1990). One suspects, though, that the major reason why this call to doing 'New Archaeology' in India has not been particularly successful is because, like 'global archaeologies' emanating from the Anglo-American world, this too unconsciously hides the distinction between the contexts of research in the First and Third Worlds. In India, as was pointed out above, the most visible progress in archaeological research has been through a broad cultural-historical approach, and there are, at least, two reasons for this. First, this is and continues to be a method of ground level investigation, which can be done by most researchers here. Second, it is work which does not require the mobilization of huge resources, which are simply not available in Third World contexts. Multi-disciplinary work—central to New Archaeology—would require massive funding of a kind which most universities and organizations where archaeological research is undertaken, would not be able to successfully garner.

On the whole, this is an approach, which has served India well and has led to important advances in our understanding of issues and periods. Take the case of

prehistory. Today, the testimony of stone artefacts which have been found in a number of localities and in early contexts, have provided dates that have dramatically revised the chronology of the beginning of hominid occupation in India. So, for instance, if the old question of how 'early' is Early India were posed, the new answer would be—about 2 million years or so. This is because stone artefacts have been found in geological deposits of the Siwaliks that have been dated to that period and these stretch from Riwat in the Potwar plateau and the Pabbi hills in the Jhelum basin of Pakistan to Uttarabaini in the Jammu area and the Siwalik Fossil Park at Suketi in Himachal Pradesh. These are major discoveries for Asia as a whole and have taken place in the context of conventional field programmes. In other words, a shift in our understanding of the antiquity of South Asia has been authored by a group of people whose field work was not determined by research strategies and theoretical predilections rooted in the latest concerns of Western theory.

Therefore, as far as I am concerned, the knowledge that a major chunk of independent India's archaeological research has been structured in this way, in what is described

as the first major phase in the history of archaeological theory—cultural or culture history—and one which has a kind of dinosaur status in the production centers of global theoretical archaeology, is hardly of concern. The reason is that it is through research of this kind that a weighty database has been created, on whose strength all kinds of skewed frameworks, ranging from simple diffusionary postulates to racist cultural ones can be questioned.

It is for reasons such as these that Chakrabarti's (2001:1191) advice on archaeological research in the Third World makes eminent sense. His plea was largely with regard to India but it is one which can well be made in relation to other, similarly rooted regional research traditions as well: "If Third World archaeology is to go anywhere, it must first learn how not to imitate the fashions and jargons of First World archaeology, with which, for various reasons, it cannot cope satisfactorily anyway. It has to pose problems that are meaningful and necessary in its own contexts and that can be pursued and solved with its own resources. It has to...at least try to reach a position in which the basic questions regarding the past of the nation concerned can be answered in a way that will be understood by most of the population."

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Interpretation in Indian Stone Age Archaeology: A Reappraisal

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Every discipline has to pass through periods of reappraisal as more and more new information accumulates. Studies focussing on human antiquity have also passed through such stages. A brief enumeration of this in the western hemisphere would be helpful in understanding the path Indian Archaeology has traversed.

One of the earliest of such attempts was observed in the pre-literate societies where the approaches to cultural history seem to be not very different from mythology. In fact, it will not be entirely wrong to state that it is this irrepressible urge of mankind to give a shape to his past that gave birth to mythology. With the rise of ancient kingdoms in early historic period one finds a more elaborate attempt being made to construct the past, while the Chinese believed that the past has traversed through stages of stones, jades and metal, the Egyptians found it convenient to count the past in terms of floods in river Nile. One notices a fresh interest in questions like origin of our planet and also origin of man appearing around seventeenth century Britain. However, strong strictures from the Christian church during this period did not allow a free development of our understanding of human past. In fact, investigations and their results basically remained

within the framework provided by religion (Buckland 1837).

Science could finally emerge out of the bondage of religion around 1857-59. First Darwin propounded his theory of organic evolution and this provided impetus to three young scientists from three different disciplines to combine their efforts to form the new discipline of archaeology. John Lubbock (1865) was a Zoologist, John Evans (1863) was a Geologist and Boyd Dawkins (1874) was a Palaeontologist. This group of scientists combined their efforts to bring together scientific evidences in order to calibrate the past as a pre-requisite to understand the progression of culture. Thus, unlike the earlier attempts the new attempt started establishing archaeology closer to the concerns of pure sciences. This had a tremendous influence in the understanding as also description of culture. One did not hesitate to describe pots and similar products of past human activities as culture. Soon we find a revival of the three age system, now termed as Palaeolithic, Neolithic and Chalcolithic. It is not difficult to see that most of the archaeological explorations conducted since then have gathered enormous amount of all kinds of products of human activity and considered

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them as discrete components of culture. These archaeologists seldom entertained the fact that archaeological evidences, which are nothing more than pure material artefacts, do not provide any information for reconstructing the ideology and value system prevailing in a now extinct society. In dealing with human culture, therefore, one has to remember that the whole is always larger than the sum total of its parts. The extra factor is provided by freedom of choice that man, as a species, is always capable of exercising. In opposition to this the new archaeologist considered all archaeological material in a group or in isolation as similar to taxons in systematics. Consistency of these attributes over time and space was taken to enunciate a culture exactly in the same manner as one constructs a phylogenetic tree in palaeontology. Naturally, it is not difficult to see why prehistoric archaeology, during this period, became totally enshrouded as a branch of applied science.

In early twentieth century archaeology continued to progress basically along the line it inherited from the Lubbockian era. At the most, now the descriptions of retrieved antiquity would be visualised within either evolutionary or diffusionary arguments. A disconcerting phenomenon emerging at this stage has been the progressively increasing deification of 'rules and laws' for explanation. Once found successful in explaining a local context it soon strives to form a 'grand law' to be used for explanation of every context. One of the reasons of adhering to such non-negotiable set of rules would seem to be the overwhelming influence that science had on archaeology. This situation continued ignoring the fact that most social scientists were reiterating that while in biological sciences transformations are possible on the basis of earlier ones which constitute their pre-condition; in social sciences acquired knowledge at every step of transformation can provide newer choices. This cardinal difference between biology and human culture has been largely ignored by nineteenth century archaeologists. All through the first quarter of the twentieth century, cultural interpretation followed the system of the earlier century. Consequently, the supposition that assumes that culture

evolves at a uniform rate in one direction in all communities all over the world became the most favoured instrument of analysis for most part. Gordon Childe possibly was the first among the top archaeologists at this time who felt that there, indeed, are some blind spots in our attempt to reconstruct past cultures. He had to emphasise that what archaeologists mean by culture need not be similar to what social scientists would mean by this term. He emphasises, "We find certain types of remains, pots, implements, ornaments, burial sites, house forms-constantly occurring together. Such a complex of regularly associated traits we shall term a culture group or just a culture. We assume that such a complex is the material expression of what today would be called a people" (Childe 1929: v-vi).

Using of ethnographic analogy for cultural reconstruction was also not free from logical fallacies and hence was criticised by many. Levi-Strauss felt that, "We can know only certain aspects of a vanished civilisation; and the older the civilisation, the fewer are those aspects; since we can only have knowledge of things which have survived the assault of time. There is, therefore, a tendency to take the part for the whole and to conclude that, since certain aspects of true correlations (one contemporary and the other lost in the past) show similarities; there must be resemblance in all aspects. Not only is this reasoning logically indefensible but in many cases it is actually refuted by the facts." (Strauss 1952, pp. 16-17). Robert Redfield (1953) also raises objections while citing the fact that great changes in human thinking are seldom reflected in human technology (which constitutes the essential part of archaeological evidence).

All these discussions creating holes in the methods extant in archaeological interpretation pushed them to the threshold of another major change in archaeology in the west. It was nearly 109 years after Lubbock-Evans-Dawson enunciated a new archaeology that Binford and Binford (1968) ushered in another wave of new archaeology. Despite the doubts expressed by the social scientists, Binfords did not feel that ethnographies of

simple societies are entirely meaningless in developing and perfecting methods of analysis of archaeological sites, and hence, the interpretation of life ways of the past societies. Almost 38 years have passed since this new perspective was initiated and numerous new questions have been sought in the New World Prehistory since then. Mostly conservative archaeologists on both sides of the Atlantic distanced themselves from this new archaeology. However, it had been able to force them to abandon their earlier approach of describing a local discovery within an already formulated macro category. Now new sites were being discovered, described and analysed purely to reconstruct their techno-economic attributes only. However, the tendency to compare with neighbourhood occurrences was not altogether given up, and as a consequence, diffusion and evolution continued to exist as the main explanative model. For instance, De Lumley *et al.* (2005), in one of the latest detailed excavation at a Lower Palaeolithic site at Dmanissi in Georgia, conclude in the following way, "The technological and typological characteristics of the lithic industry from Dmanissi allow to attribute the assemblage to a 'Pre Oldowayan' cultural horizon characterised by the absence of small retouched tools which appear in East Africa from 2.55 mya. This cultural horizon is present at the border of Europe at Dmanissi, around 1.81 mya and Western Europe in the shores of the Mediterranean at Barranco Leon around 1.3 mya and at Fuente Nueva 3 at 1.2 mya" (pp. 3). The term pre-Oldowan to be used for a culture in Georgia clearly reflects the evolutionary model of explanation. In the same way that diffusion is being alluded to, in the later part, cannot be missed. De Lumley *et al.* had published another mammoth excavation report of the site Fejej FJ-1 at south Omo in Ethiopia a year earlier (De Lumley *et al.* 2004) and here also the conclusions do not show any deviation from the pre-set rubric of evolution and diffusion.

Thus, one can see the all round influence of Darwin, all through, in European Prehistory. Indian prehistory not only took birth under these influences, but continued to progress generally within the same influences. We seem to be constantly forming vertical classes and sub classes

within this kind of a linear evolutionary schema. Palaeolithic researches can provide rich possibility of understanding how the earliest human colonisations took place and what kind of ecological factors influenced what kind of settlement patterns as well as numerous other questions regarding patterns of human activities. Such questions seem to be never asked. Instead most of our researches in Stone Age Archaeology till late sixties continue to use evolution as the sole explanative model. Consequently the methodology adopted for data retrieval also do not show any change from early twentieth century archaeology of the west. B. Subbarao (1952) was possibly the first among Indian archaeologists who tried to transcend above chronological and typo-technological issues.

A distinct change in the approach of study, at least, in stone age prehistory, starts being visible from about 1978 when a large scale multidisciplinary research was undertaken in the Thar desert. Even here the emphasis was mainly focused for understanding the climatic changes during the Middle and Upper Pleistocene of the region (Misra *et al.* 1980 and 1982). Simultaneously K. Paddayya started an intensive survey of the Hunsgi-Baichhal region of Gulbarga district in Karnataka. More than 100 Lower Palaeolithic sites were discovered and many of them excavated (Paddayya 1968; 1977a; 1977b and 1982). The emphasis of research in most of these documentations seem to be on issues of site formation as well as landscape reconstruction besides a routine typo- technological representation. Shanti Pappu (1996a; 1996b and 1999) takes over an elaboration of this new approach in her excavations at the Kortallayar basin in Tamil Nadu. Misra (1978) published a preliminary report of the excavation at Bhimbetka in Raisen district of Madhya Pradesh. A comprehensive typo-technological detail of the Palaeolithic material from the excavation at shelter no. F III-23 is published in this paper. He goes on to compare these with other Palaeolithic material discovered till then and suggests that Acheulian occupies two distinct stages in India. The older of the two was designated as Early Acheulian and younger one as Late Acheulian.

Assemblages comprising of high percentage of chopper and chopping tools and also absence of cylinder hammer technique were counted as discriminating attributes of Early Acheulian. On general relative dating estimates this state was attributable to anywhere between 300,000 to 150,000 BP. Obviously the younger Acheulian, which by far shows a larger distribution, was taken to be occurring anywhere between 150,000 to 100,000 BP. These rough estimates were totally unsettled when in a recent paper Paddayya *et al.* (2002) published an ESR date of 1.2 million years for one of his Isampur layers. As such, it would seem that one should wait until more dates are available from tool bearing zones.

Going back to the Acheulian stages, as envisaged by Misra *et al.*, we find that though Adungarh and Bhimbetka lie approximately 50 km apart they show remarkable similarity in their typo-technological features as well as the raw material used, yet Adungarh yields nearly 40 percent chopper/chopping tools while Bhimbetka is totally free of any pebble based tools. In the same way Chirki-Nevasa in Maharashtra, Kuliana in Orissa, and Hunsgi in Karnataka show upper Acheulian character with rich chopper/chopping component. The fact is recorded and fully recognised yet an adequate explanation of this is yet to be attempted. Neither evolution nor diffusion can explain the relation of non-bifaces to bifaces unless we start looking at these assemblages as the product of cumulative knowledge interacting with imperatives of adaptation. The rocky elevation at Bhimbetka and its extension in the Barkhera region has no pebbles available while the sites near big rivers like Narmada at Adungarh, Pravara at Chirki and Hunsgi nallah at Hunsgi have large outcrop of pebbles and these must have provided handy raw material for the preparation of tools. In other words, even if ideas and techniques migrated through gifts as the medium of social intercourse, a reproduction of the same in different eco-zones might not always have been possible. Thus seeking an answer through either evolution or diffusion may be grossly misleading.

The case of the Middle Palaeolithic as well as Upper

Palaeolithic in India further demonstrates this eco-dependence of the cultural mosaic. While shift to crypto-crystalline rocks heralds this change on the riverine sites, Bhimbetka successfully maintains a real advanced Late Pleistocene culture with the only available rock type that they have been used to during Lower Palaeolithic, i.e., ortho-quartzite. One can see almost similar situation in Renigunta as also in other parts of Andhra Pradesh. Thus, a uni-causal explanation for any scene of cultural transformation would seem to be totally inadequate to explain the observed facts. Further, the extant explanative models do not consider the fact that the demographic pressure within a local group also plays an important role in pushing the social boundary away from the natal band. Such a process extended over a time period can also contribute to cultural transformation. Further, the shade and kind of stress can also vary in form and function from other kind of changes brought about by several other possible stresses like climatic change, social discontent, migration as also technological innovations. Middle and Upper Palaeolithic in India is largely known from secondary alluvial deposits. Also in many instances these do not maintain distinct and differentiated stratigraphy either. A few sites identified along the middle Son Valley in Madhya Pradesh and the Bhimbetka caves are possibly the major exception to this rule. Both Bhimbetka and some of the Son sites have been excavated. The Patpara formation among the 23 sites identified as factory sites on the Son has tentatively been dated (Sharma and Clark 1982; Williams and Royce 1983) between 100,000-30,000 years ago.

However, as evidenced in majority of alluvial sites, there seems to be ample evidences to show that many of the Late Pleistocene cultures continued to occur without any change well within Holocene period. The Damim area of Santhal Parganas (Chakravarty 1986) and numerous areas in the Bhimbandh region of South Bihar (Bhattacharya and Singh 1998a; 1998b) have yielded evidences of regular Upper Palaeolithic blades and/or tools made on them on the surface of flat rocky plain which are suspected to be fairly recent in context. In fact at Paisra, a

Lower Palaeolithic site in South Bihar (Pant, Jayswal and Tiwari 1978), a rich microlithic assemblage is found overlying the Acheulian levels. In almost all Deccan Neolithic sites the lowest occupational layer has invariably yielded highly weathered flake tools that compare very well with the Middle Palaeolithic culture of the region. Subbarao (1958) even goes to the extent of identifying some of these as Levallois flakes at Sangankallu. In another instance Shaffer (personal communication) excavating in Watgal (Devaraj *et al.* 1995) in Raichur district of Karnataka reported that these flake tools occur below the lowest occupation level of Deccan Neolithic-Chalcolithic culture after an intervening sterile layer. Apparently much attention has never been paid to these occurrences. If the lowest of the occupation of these sites is put to 2500 BC then the flake assemblage certainly cannot be older than 5000 BC. Consequently Palaeolithic types continuing well within Holocene would be strongly indicated. Possibly a completely non-negotiable Eurocentric approach has prevented us from entertaining such possibilities of archaic typological clusters continuing in many areas. If we look at the evidences from south-east Asia, Pacific islands and Australia (Bellwood 1985) we will find that it is a phenomenon not unique to India.

As regards the function of the tools, it must be emphasised that many late Pleistocene occurrences show types identified in European Epi-Palaeolithic; yet this need not imply that at both the regions they were created for the same range of functions. For instance, Burins or Gravers are believed to have been used for engraving designs on ivory and antler in mid-latitudes of Europe but this was used only for 'groove-and-splinter' working on antlers in European northern flat-lands. The profusion of this type in India during 20,000 to almost 2000 BC remains unexplained, in a way, especially because we do not have any antler-working known in this period. It would seem that this type was found useful to open fresh water shells or even drive holes on wood. This conjecture would also be substantiated by Barton, Olszewski and Coniman (1996) who have discussed at length the probable functions of burins in three south Asian sites.

Mesolithic culture in India, at least as far as the excavated evidences go, ranges from nearly 8000 to 1000 BC. Obviously one has to admit that both Neolithic as also Chalcolithic, in certain areas at least, fall within this time bracket. That is, while Neolithic and also Chalcolithic emerged and flourished in suitable regions, elsewhere Mesolithic may have continued. In all likelihood the latter, in many instances, may have entered in symbiotic relationship with their neighbourhood. Conditions for the emergence of Mesolithic as such, requires more of deliberations than it has received so far. When archaeologists remain distanced from arguments of such adaptational imperatives they are likely to overlook the main issues of working of the society. There are some studies like those from the deposits of the river Tarafeni (Basak *et al.* 1998) which claim very early antiquity for the transformation of Mesolithic culture. If climatic change is taken as the main causative force for the transition, it will really be a claim, which is rather early for Tarafeni, which is exposed to the cyclonic impact of the eastern coast. On the contrary if one has to look for a region for the earliest transformation of Holocene culture, the area south of Allahabad and extending to the Son valley further south would appear to be the most legitimate. Numerous undulating mountains spread over thousands of square kilometres in this area are capable of maintaining hundreds of rainwater lakes and there are many underground water springs criss-crossing the region. Late Pleistocene marked a big population increase in the whole region including in the hills further south (Sharma and Clark 1982). These population groups surrounded within small hill ranges or hill slopes formed insular microzones for adaptation. Any form of sudden change in the climate can have a much magnified effect on these small population groups. Hence a transformation in hunting strategies can be triggered in some of them who would eventually emerge as Mesolithic in culture. If gradual change of climate renders some areas more congenial to fishing and others to hunting, we start getting differentiated shades of cultural clusters. The Gangetic clusters and the Bhimbetka-Adamgarh groups can be taken as two such different kinds of adaptations separating out

from possibly a generalised ancestral form which originated in the eastern extension of the Vindhya probably triggered by the combined effect of increasing aridity and also rise of population density.

Misra (1985) has listed 27 excavated Mesolithic sites from India. He further opines that of the 27 excavated sites a large majority are concentrated in the western part of India. Besides as many as 21 of these (constituting more than 77%) occur within 25°N (Bagor in Rajasthan) and 20°N (Patne in Maharashtra). Such a preference for the regions across the Tropic of Cancer for Mesolithic settlements as also their being concentrated in the western part may be significant in terms of pattern of climatic change. In order to look for a possible explanation of the phenomenon we might recall the argument of multiple seasonality with sharp boundaries as discussed by Kelly (1983). On the basis of this argument it may not be difficult to suggest that climate stress must have been more acutely felt across the Tropic of Cancer, which must have led to rapid transformation in this zone. May be within these parallels Rajasthan-Gujarat zone shows a larger concentration of microlithic sites because it represents a progressive migration of the eastern groups to the west in search of scrubby forests where missiles can operate more efficiently. The Langhnaj group in Gujarat probably represents one of the youngest of these westward migrating groups. The entire stretch of younger microlithic clusters found spread in the Gangetic flat-lands west of Pratapgari can likewise be viewed as representing another area of westward migration. That is, the original microlithic transformation of the Belan region can be explained as having progressed towards the western rain-shadow areas and this eventually might have given rise to another cultural transformation further west at Mehrgarh. This kind of progression seems to agree with the 'wave model,' which was first described for genetics by Fisher (1937). Subsequently Ammerman and Cavalli-Sforza (1973) examined the possibility of computer simulation of the wave model to explain the progression of Neolithic in Europe. The microlithic transformation in Sri Lanka during Upper Pleistocene at a number of sites (like at

Batadombalena, to name one) defy most of our climatic change arguments delineated above. Consequently one has to admit that to put all our balls in the basket of climate is not correct. Changes may occur due to many other factors. Population stress and the ability of the community to organise its increased population power to optimise resource retrieval potentiality are some other factors, which might also play important role in creating transformation. Faunal material recovered from the Gangetic sites indicate that large herbivores like elephants, bovids and deers continued to be hunted there. So unlike the usually-held view that microliths were used for 'fishing and fowling,' the Gangetic sites need to be explained with different arguments. In other words shifting to R-selected species (short maturation animal and plant types) from K-selected species (long maturation animal and plant types) is taken as the main cause of microlithic transformation all over the world. However, for the Gangetic flat lands and Sri Lankan mountainous region the resource-optimisation argument would seem to be more correct. The rich biodiversity available provided considerable security of supply to many parts of India and therefore unlike in the temperate Europe, Indian Mesolithic must have been a prolonged and reasonably successful economy. In fact, in several parts we find a pure microlithic industry continuing until a time when a few metal objects start seeping in along with ceramics. In a very strict sense, therefore, a pure Neolithic stage preceding the Chalcolithic is not identifiable in these areas. The sub-tropical forests maintain such rich bio-mass that, even today, some purely hunting tribes are found surviving in these pockets (Misra 1990; Nagar and Misra 1989).

The present author during a recent fieldwork among the Birhors of south Bihar (Bhattacharya 2004) found not a single hunting tool among their tool kit. In fact, the trapped animals (everything from squirrel to deer) are bartered by the Birhors to collect cereals from the neighbouring agricultural communities. It is, as such, not difficult to explain why upto as late as 1000 BC the richness of the forests not only created no pressure on many of the forest dwellers but there was considerable

potentiality of creating surplus of animal food in them. The Bihor ethnography also enabled the author to understand the dynamics of function of a hunting community. For instance, a band can have several domestic groups in it. However, the overriding power of the economic imperatives of the band transcends over interests of smaller domestic units within the band. This is operationalized by a general underlying principle of reciprocity visible in almost every band structure. That is, every household enjoys equal access to the subsistence base chosen by the band. Reciprocity levels out the possible unequal collection at the end of the day. Many authors have viewed this important character of a band structure as 'prescriptive altruism' (Ingold 1983). This can clearly be viewed as a mechanism, which submerges individual needs within the need of the entire band and thereby provides an excellent ground for evolving identity as also solidarity.

Drawing a clue from the Bihors one can propose that few newly settled communities along the river valleys might have entered into a regular symbiotic relationship with the forest dwellers. Symbiotic relationship with a 'higher' culture totally stops the need to change in the 'lower' culture. This is mainly because the latter can, with the help of this mechanism, continuously enjoy the benefits of a different economy and knowledge system without undertaking the burdens of this alien system. Further, the 'higher' culture being now tied to farm land can hardly move around for those forest produces on which it had been dependent for a million years, like animal flesh, skin and honey to name a few. Thus, what I call 'politics of resource manipulation' starts operating. That is, a 'higher' culture's need for forest produce makes it prevent the 'lower' culture from changing. If one can consider these arguments, then it is not difficult to understand why bands of Mesolithic culture bearers survived well after the second millennium BC in India. That these Mesolithic culture bearers had no lack of nutrition and in fact indicate a decline of nutrition in the subsequent period is also a strong possibility shown by anthropometry. Lukacs (personal communication) reported a sharp decline of

stature as one compares the Mesolithic skeletons with Neolithic and Neolithic-Chalcolithic skeletons. It does not, however, mean that resource competition or usurping of rich eco-base by adjoining communities was not unknown. Lukacs and Misra (1997) noted a specific kind of fracture on the ulna in many of the middle Ganga as well as Mirzapur Mesolithic skeletons in an identical manner. This fracture, usually referred to as Parry's fracture, is caused when one is trying to defend oneself from a blow by lifting the hand. The skeleton with a microlith imbedded in one of the vertebrae at Sarai-Nahar-Rai in addition to the Parry's fracture would certainly indicate conflict in this region. Possible repeated migration of exogenous bands to this region may have caused dispute of resource retrieval rights and hence resulted into aggression.

The concept of Neolithic has not undergone much change from the time of Gordon Childe (1929). If viewed in archaeological terms it represents the last of the stone ages which shows evidence of food production either directly deducible from charred seeds or from the presence of ceramics as containers for storing the surplus which can also be taken as indirect evidence. Ever since the evidences of Neolithic settlements from the Balkans to United Kingdom started appearing, one could list a series of important cultural features for this period. The most important among them can be summarised as follows:

*Between 7000 and 3000 BC people settled in groups in suitable areas to support themselves by farming and animal herding.

*They prepared specially-rubbed stone axes to clear the field and grinding stones to process the food.

*Both settlements at a place for considerable period and also storing the harvest were the most important prerequisites of this economy. Hence, the appearances of relatively more stable dwelling structures as well as pottery are taken as the discriminant markers for this chrono-cultural stage.

*Finally it has been argued that such labour-intensive activity and handling of surplus requires a more complex ordering of the society and adequately constructed ideology.

The earlier existing view about horticulture preceding agriculture was no longer considered a rule and consequently the evolution of the digging stick to hoe and then to plough could not be substantiated from archaeological evidences. Curwen and Hatt (1953) further suggested a stage of semi-agriculture where woman were engaged in actual cultivation and men either hunted or herded animals. Yet another variant of settled economy was first theorized by Sauer (1952) and later by Hutterer (1976). This saw the subsistence base being asexually reproducing, plants such as plantago, taro, yams, sago palms, tapioka, etc., which required no clearing and replanting. This is essentially a horizontal manipulation of ecology, unlike in seed agriculture which required vertical manipulation. Usually fishing was resorted to as the protein source in this kind of ecology. Many specialists believe that this kind of economy was adopted in the tropical lands of south-east Asia, Oceania and probably also in suitable areas of Indonesia.

Apparently our understanding of Neolithic in India does not take into account all these shades of adaptation. Scant attention has been paid to the fact that clearing of a virgin forest by burning and axing was not necessary in either root-crop culture or wild-seed collecting culture. Seed agriculture, on the other hand, being extremely labour intensive required a great deal of social investment. The latter kind of economics results into sites which are spread over larger area. The factor of social investment has to be understood mainly to speculate the manner in which a community operationalizes labour as well as re-distribution of produce. Probably one of the earliest ways to achieve such a labour management was by creating certain permanent loyalties. I shall like to propose that these early farmers had to convert unstructured casual mating within or between members of bands into the institution of marriage. This can at once tie certain members of the natal

band or even the band cluster into obligatory kinship loyalties which can be easily converted into assured labour. Since this institution solves a series of problems in the smooth functioning of society it is also provided with an important dose of ideological rider. Every community attempts to construct their ideology to give a ritual aura to the institution of marriage to suit its chosen social ordering. Chastity, virgin cults, etc. are some such ideological cappings. Thus, one has to view the emergence of farming as a whole process of internal ordering rather than the mere occurrence of celts and ceramics. Boserup (1965) views another way of organising and management of labour. She feels that slave raiding could also provide an alternative but archaeologically one cannot demonstrate the possibility of such an alternative until about middle of metal age.

In Indian archaeology, Neolithic culture offers a large number of problems of explanation, which have still not been systematically addressed. One of the biggest of these is that on a pan-Indian basis one cannot necessarily accept Neolithic as preceding Chalcolithic. The discovery of Chopani Mando, Mahadaha and Koldihwah in the south of Ganga Valley (Sharma *et al.* 1981) led many authorities to surmise that Neolithic does indeed precede Chalcolithic like elsewhere in the Old world specially as evidenced in our western border (Mehargarh in Baluchistan) and eastern border (Ban Kao, Ban Chiang and Non-Nok-Thai in Thailand). The radiocarbon dates from these sites fall between the time bracket of 6700-4500 BC and this led Thapar to declare, "That (they) dispel the notion of the diffusion of Neolithic culture of the Belan valley" (Thapar 1987, pp. 250). It is not difficult to understand that this statement is solely based on the radiocarbon dates, which are now being doubted by some authors. Puroshottam Singh reports on this matter in the following way, "The two radiocarbon dates from Koldihwah in the Vindhya fall between the time bracket of 6700-4500 BC. But as stated earlier, the charcoal sample in question are now said to come from the Pre-Neolithic strata at the site. Barring these two dates we have more than fifty dates from as many as fifteen sites distributed all over the country and all of them

consistently fall between 2400 and 1700 BC" (Singh 2002:144).

The Neolithic sites excavated so far do not show a kind of population structure anywhere comparable to Çatal Hüyük in Turkey or Jericho/Jarmo in Jordan. It would appear that wheat and barley adaptation requires sturdy axes to clear the bushes and numerous grinding stones to process the seeds. The activity schedule in such smaller communities has to be vastly different from such smaller human colonies clustering around lakes and rivers that are found, say, in east India. One can at once see why the celts in these areas are so peculiarly small for their assumed functions. In fact even the ring stones found in many of these sites are also like toys and may rightly have served the function of net sinkers, as many authors had earlier believed. Even if we have found seed cultivation in some late occurring sites, their small size would tend to indicate no labour intensive farming activity. For instance, at Chirand we have only four celts from the excavation pit. Yet an enormous amount of hunting implements prepared on bones and antlers testify to the fact that possibly production of cereal did not occupy the central concern of these people. Another important fact to which hardly adequate interpretation has been done is that here a thick layer of fish scales, some times extending as much as 6 inches in thickness has been recorded (Basudev Narain, personal communication). Therefore, one can consider Chirand as a fishing village where a moderate population was settled who had been hunting and fishing regularly. Most of the pulses and cereals discovered here could have been obtained by trading with more favourable agricultural sites further up stream. The lack of adequate number of celts and the projected demographic strength of Chirand can then be easily explained.

Another important consideration, which has received little or no attention, is the distinct evidence of palaeo-ethnic movements operating in many parts of India from a very early date. Raw material for celt manufacture is usually not found in the areas where these are needed,

that is, in flat alluvial stretches. This point is further proved by the fact that a celt was made on antler at Chirand. Palaeo-ethnic groups (most probably belonging to a late hunter-gatherer economy) started quarrying, finishing and trafficking these axes. Naturally root-gathering and fishing communities in the intervening regions acquired products of agriculture in exchange for these products. Sulabhdihī in Sundergarh District of Orissa almost proves our point about quarrying rocks for trafficking (Behera 1991-92). But this requires our granting the knowledge and technology of celt manufacture actually to the microlith users. Again, technology deciding a cultural status, as traditional archaeologists have prescribed, will take a sound beating if we have to understand the evidences. Further, it would also appear that cultural stages need not always be considered as watertight vertical stages. In terms of horizontal spread as well, one can see the possibility of diverse economies coexisting and also to top it all there are always fuzzy boundaries in the areas where such economies meet. Neolithic transformation in India shows that neither does this event occur at a uniform time nor does it occur with the same characteristics every where. Adapting to root-crop culture and collecting wild rice along with fishing, hunting and honey-collecting characterise the eastern region. Adapting sturdy millets like Ragi and Hulgi and intensifying livestock-keeping show progressive specialisation over the rocky plains along the river Krishna and its southern tributaries. Western India, especially between 22° N to 28° N, i.e., spread over Punjab, Haryana, and Rajasthan still shows no evidence of Neolithic transformation. It is farther west in Baluch region that we see the earliest evidence of farming of naked six-row barley einkorn and durum wheat. These being the only forms, which could afford substantial surplus, led to rapid growth of settlement eventually giving rise to consolidated social and political units. It is needless to re-emphasise that this distinctly different transformation coexisted with usual scatter of hunter-gatherers. In fact, the pattern of transformation observed in Indian Mesolithic does, indeed, suggest a punctuation model of progression (Bhattacharya 1992). In general, the extant method used in Indian archaeology tends to club together all these shades and

varieties of adaptation under a single category. Consequently, people can mistake them as representing full-blown Neolithic society. Way back in 1993, Paddayya had initiated an interpretation approach to reconstruct activity and life-ways at Budihal ashmound in the Gulbarga district of Karnataka. Subsequently in 1995, he had involved Palaeontologists to work out jointly the animal butchering activity of the same site (Paddayya, Thomas and Joglekar 1995). Unfortunately, very few other archaeological investigations have approached this kind of interpretations. Naturally, Singh (2002:144) finds no other alternative but to conclude, "The reason for such a late dating of the Neolithic in the sub-continent is far from clear (Italics mine). Are we dealing here only with the cultural backwaters of the Neolithic?"

In the sequel we must conclude that our method of analysis and cultural interpretation in Stone Age Archaeology has never depended on sound theoretical constructs. Although in the recent years one can see a lip service being paid to the integrated nature of archaeological evidences, yet an integrated system of analysis for the discipline have not been attempted. For them economy, polity, religion, kinship as well as cognitive cultures are seen as mainly epiphenomenal or even inconsequential. Possibly Hodder (1982) is right when he considers that this lapse in our interpretation has been caused by an overwhelming influence of structural and functional models in archaeological theory.

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Aryan Agro-Pastoralists in the Ganga Valley

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A large number of chalcolithic sites, datable to about 2200-1300 BC, have been brought to light in recent years in the Ganga Valley, more particularly in the Middle Ganga Plain (Singh 2003) and a few have also been excavated, albeit on a small scale (Fig.1). They are all rural settlements characterized by mud architecture, painted pottery, stone and bone tools and restricted use of copper. Their mixed economy was based on subsistence agriculture dominated by barley cultivation, stock-raising and hunting-fishing. A most noteworthy feature of these early farming communities is that they betray Harappan elements in their cultural equipment (Singh 2000-2001). However, it must be mentioned that some of these sites, as for instance, Koldihwa and Lahuradeva, were occupied much earlier in the 6th-5th millennium BC, but seem to have been abandoned in the forth millennium and consequently remained uninhabited for over a couple of millennium or more (Tewari *et al.* 2002-2003).

This cultural scenario is in sharp contrast to the literary evidence because the colonization of the Ganga basin is generally attributed to the Vedic Aryans on the basis of the legend of Videgha Mathava who, with his priest Gotama Rahugana, went as far east as the Sadanira

River (present Gandak in Bihar), and cleared land for cultivation by burning (*Shatapatha Brahmana* I, 4, 1, 10-19). The problem has now cropped up as to who were the early farmers in the Middle Ganga Plain: Harappans or Aryans? This enigma can only be solved if it can be established that the Harappans and the Aryans were one and the same people. In this context it may be stated that attempts have recently been made to identify the Harappan civilization as that of the Vedic Aryans (Lal 1997, 2002; Gupta 1996).

The problem becomes more complex because of the controversy about the chronology of Vedic literature, more particularly that of the *Rigveda* which seems to be hanging in a sort of chronological vacuum between 10000-1000 BC. However, it is possible to do it reasonably on the basis of archaeological evidence. It has been established that the Rigvedic Aryans did not know iron as the word *ayas* in the *Rigveda* (I, 57, 3) denotes copper and not iron (Mehendale 1978-79), and when iron came into use, it was referred to as *krishna ayas* (*Jaiminiya Upanishad* : II, 90) whereas in the *Matrayani Samhita* (IV, 2, 9), *ayas* is divided into two classes: *syama* (iron) and *lohita* (copper). Formerly, iron was supposed to have been in

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use in India as early as 1000 BC on the basis of the evidence of the PGW culture, but now its antiquity can be stretched to at least 14th century BC or even to a still earlier period (Tewari *et al.* 1999–2000).

It is evident from the *Rigveda* that horse was the most favourite animal of the Aryans, and that it was also associated with their religious beliefs. However, its occurrence at Mature Harappan sites is controversial (Meadow 1977). Even if we concede for a moment that the Harappans knew horse, its total absence on their seals is betoken of the fact that it did not play any role in their religious system. It, however, occurs in Late Harappan levels at many sites (Thomas and Joglekar 1994). The presence of horse and absence of iron therefore allows us to place the *Rigveda* in the first half of the second

millennium BC with a reasonable margin on either side. This, incidentally, is also the date arrived at by Witzel (1995) on the basis of the internal evidence of the *Rigveda*.

The Aryans were living in the Sapta-Sindhu region delimited by the Sindhu (Indus) in the west and the Saraswati (present Ghaggar in India and Hakra in Pakistan) in the east. The only culture which was spread here in the first half of the second millennium BC is the Late Harappan and it therefore necessarily follows that if at all there were any people whom we meet in the *Rigveda*, they could only be the Late Harappans and none else (Dhavalikar 2005).

There is thus circumstantial evidence to indicate that the Late Harappan and the Vedic Aryans were in all likelihood one and the same people. Evidence from recent

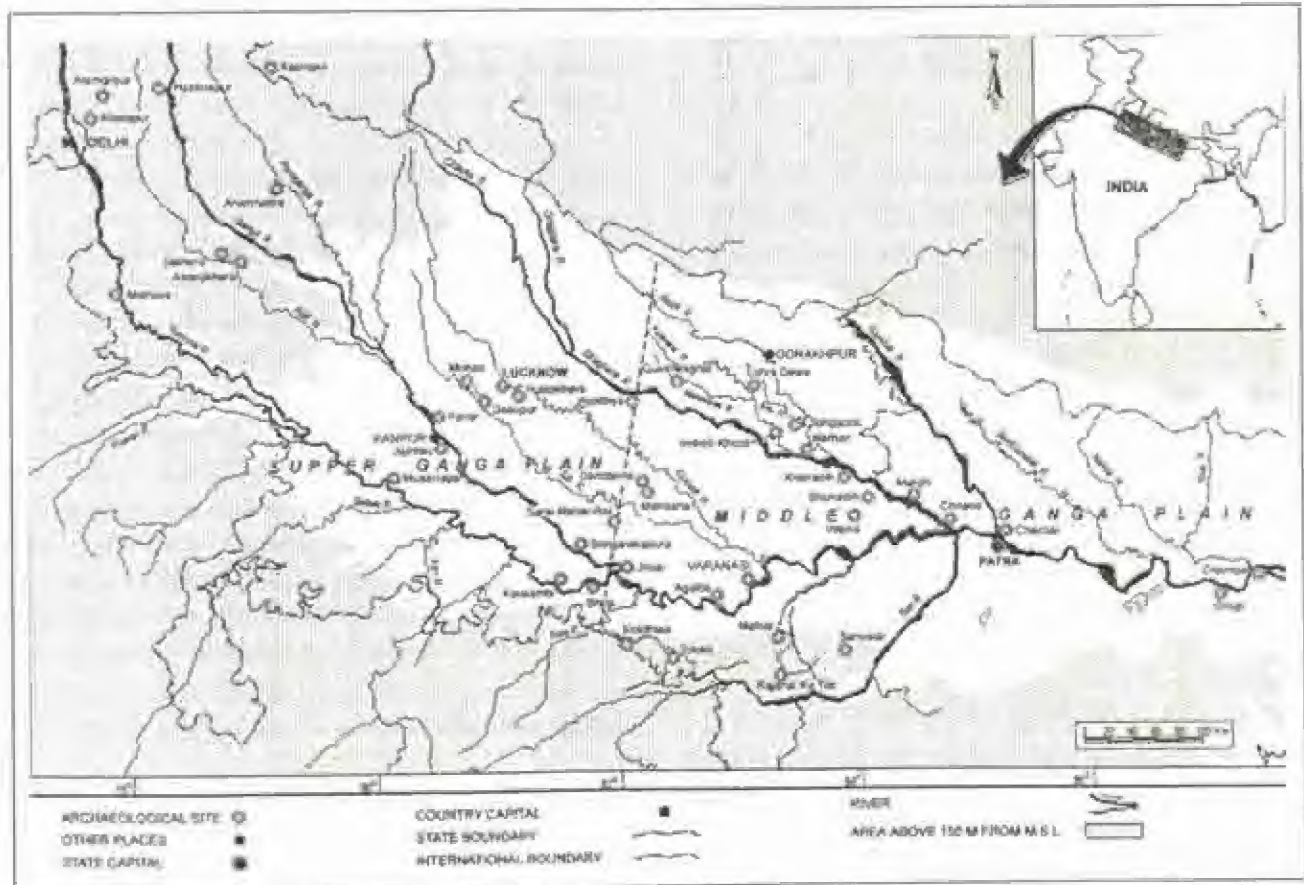


Fig. 1: Important early archaeological sites located in Upper and Middle Ganga Plain (Uttar Pradesh & Bihar) After Tiwari *et al.* 2002-03

excavations at Harappa points to the decline of that glorious civilization from about 2200 – 2000 BC for which the decreasing foreign trade with Mesopotamia (Ratnagar 1981) and environmental degradation (Singh 1971) were largely responsible. It was precisely at this time that the river Saraswati began to dry up in its lower reaches because of the diversion of courses of its two largest tributaries; the Sutlej and the Yamuna which joined the Indus and the Ganga systems respectively (Mitra 1994). As a consequence, the Harappans – rather Late Harappans – started migrating to different regions in search of new pastures. Some of them reached as far as east as Bihar as the legend of Videgha Mathava suggests. According to it, he took Agni Vaisvanara in his mouth and cleared the forest by burning and made land available for cultivation for Aryans. The legend seems to suggest that the region in the east was unoccupied and forested. However, it has been argued on the basis of palynological data that there was thin forest cover which needed no burning.

The long-standing view regarding the prevalence of dense forest cover over the entire Ganga Plain to the east of the Yamuna, and their clearance of the mass production of iron artefacts for large scale human occupations is not tenable. Palynological and botanical studies carried out in the Upper Ganga Plain are indicative of a savannah landscape dominated by grassy vegetation along with thicker wooded pockets from about 15000 BP. Sufficient open land was available along rivers and lakes; both in the Upper Ganga Plain and the Middle Ganga Plain to accommodate human settlements and required agricultural fields (Tewari *et al.* 2004:113).

There is little doubt that iron artefacts were not used for clearing forests for the simple reason that evidence from other parts of the world indicates that burning is the most effective and easy method. The agricultural history of Europe shows that the older theory, that 'forest land was too difficult to cope with for very primitive people' is not correct. It ignored the fact that land was cleared for agriculture not by felling the trees, but by burning the forests (Boserup 1965:17). Besides, the ash which in the

process falls on the ground serves as a good fertilizer. It may also be pointed out that the older theory that alluvial stretches along the river banks were cultivated by early farming communities has proved to be untenable.

The issue that then emerges is how to interpret the literary data furnished by the Vedic literature and to collate it with the archaeological evidence. It will be seen that the problem is not insoluble; on the contrary, it seems that the evidence from the recent excavations carried out in the Middle Ganga Plain corroborates with the literary evidence. The sequence of prehistoric cultures established thus far from Senuwar and other related sites demonstrates that sometime in the last quarter of the third millennium, the first farmers arrived in this region probably from the Belan Valley and located their settlements. They practiced subsistence agriculture; cultivated rice, the only cereal; kept cattle; used coarse pottery and stone and bone tools; but did not know copper. This habitation, labelled Period I-A, has been provided the 2200 – 1950 BC time bracket (Singh 1995-96). These Neolithic settlements have been discovered at quite a few sites.

The first cultural period at these early farming settlements has been divided into two sub-phases; IA (2200 – 1950 BC) representing the Neolithic, and II (1950 – 1300 BC) which is chalcolithic when copper came to be used. The most important feature of this phase is the introduction of new grains which include barley (*Sorghum vulgare*) and wheat (*Triticum aestivum*) among others (Singh 1995-96:90-91). These species, according to the palaeobotanist, are the same as those raised by the Harappans (Singh 2004: 605-8). The Harappan influence has been noted at several sites which include Chirand, Taradih, Maner, Chechar – Kutubpur, and Senuwar.

Harappan Influence

The Harappan influence in the Ganga Valley is now slowly becoming discernible not only at OCP sites but also in the Middle Ganga basin at several sites such as Chirand, Taradih, Maner, Chechar-Kutubpur and Senuwar

(Saran and Sant 1994). As already stated it appears that barley, wheat and many other grains were probably introduced by the Harappans. So were the underground ovens (*tandoor*) for baking bread. The ceramics, particularly some forms in the painted black-on-red ware such as dish-on-stand, cup-on-stand, and pointed goblet can be said to have Harappan inspiration behind them. Similarly the long tubular beads and the steatite disc beads and micro beads too are in the Harappan tradition. But the most noteworthy is the disc-shaped bone object with holes and parallel cut-marks along with central hairlines has been identified as an angle measure or a surveyor's cross. Exactly identical objects have occurred at Banawali and Kalibangan (IAR 1962-63 : Pl. LXI, B). These terracotta instruments have a central hole with two lines going across the surface. All this is certainly betoken of the presence of Harappans – rather Late Harappans – in the Ganga Valley.

The significance of the Harappan contact in the Middle Ganga plain can be understood in the context of the legend of Videgha Mathava. What is more, the *Rigveda* (III, 53, 14) mentions the tribe of the Kikatas in this region and also refers to a Kashiraja (*Rigveda* IX, 76; X, 179, 2). This in a way indicates that the Vedic Aryans cleared land for agriculture by burning forests and located their settlements whereas in some places they found some people, like Kikatas, already leading a sedentary existence. The Aryan migration towards the east is already referred to in the Vedic literature. Michael Witzel (1995:320-21) has drawn attention to a reference in the *Baudhayana Śrauta Sūtra* (18.44:397.9) supporting Aryan movement from the Sapta-Sindhu to the east. Ayu went eastwards. His people are the Kuru-Panchala and the Kasi-Videha (His other people) stayed at home in the west". It has rightly been pointed out by Lal (2003) that the translation of the latter half is incorrect; and it should be "that others migrated west."

This was the cultural mosaic in the Ganga Plain in

the second millennium BC. But the situation has now become more complex because of the recent discoveries which, being of crucial importance, deserve a close scrutiny. The excavation at Lahuradeva, a small site spread over an area of about 10 ha, and with the thick cultural deposit, has yielded on excavation a five-fold sequence of cultures starting from the Neolithic and ending with the early historic by 300 AD. The first two cultural periods mark the earlier farming stage and the remaining Iron Age (III), NBP (IV), and early historic (V) respectively (Tewari *et al.* 2002-2003). The last three cultural periods are well-defined but the first two need some reconsideration. Even among these, Period I, has been sub-divided into two phases, IA and IB labelled the Early Farming stage, whereas Period II represents the Developed Farming stage. On closer examination Periods IA and IB also seem to represent two different cultural periods separated from each other not only culturally but also in view of time-gap*, and it is this difference which has become problematic and therefore needs a fresh look.

Let us first examine the cultural material from these two sub-phases of Period I. It is stated that even the nature of deposits in which the cultural material occurred is different; the former in the clayey sand with *kankar* nodules, about 45 cm thick (Tewari *et al.* 2002-03:39), whereas the latter came from a compact yellowish clayey silt (Tewari *et al.* 2002-03:43). If both the phases belong to the same cultural period, the nature of the deposit should normally not be much different. But the deposits are different because they are separated in point of time by at least three thousand years; and since the environment in the sixth millennium must have been different from that in the third- second millennia, there is a change in the nature of the deposit.

Perhaps the most noteworthy difference between the two phases is that the people of IA consumed rice, both wild (*Oryza rufipogon*) and cultivated (*Oryza sativa*), whereas barley (*Hordeum vulgare*) and dwarf wheat were

* According to the anthropological theory, no culture could be stable for such an inordinately long period of time.

introduced in IB. This certainly marks the arrival of a new people at the site. According to the botanist, these new grains resemble Harappan. They occur in levels belonging to the first half of the second millennium BC and the Late Harappans may therefore be credited with their introduction at the site. Other species include lentil, field pea, khesari (*Lathyrus sativus*) and even water melon (*Citrullus lanatus*), mango and jack fruit (Singh 1995-96: 90-91; 2004:604-08).

The ceramic assemblages of IA and IB are dissimilar though apparently they share some common elements which have been taken to mark the overlap between the two phases. Period IA is characterised by mainly red ware and BR ware, both handmade, and there are a few sherds of the BR ware made on a slow wheel, possibly a sort of tournette. In Phase IB too the coarse red ware and BR ware occur, but their fabric improves and the proportion of burnished pottery also increases. A new element is the red slipped ware with incised designs. New forms such as beakers, and perforated and legged vessels appear for the first time.

Dating

The same is the case with chronology. The radiocarbon dates for charcoal samples from IA are as follows (Tewari *et al.* 2002 – 2003):

1.BS-1951: BP 5320 ± 90 (Calib – BC 4220, 4196, 4161)

2.BS-1966: BP 6290 ± 160 (Cal. BC 5298)

The C14 determinations for IB are as follows :

1.YA-2 Qd 14 : BS 1950 : BP 3750 ± 90 (Cal. 2135, 2079, 2056)

2.YA-2 Qd 11 : BS 1938, BP 3180 ± 70 (Cal. BC 1519, 1435, 1399)

It is evident that Period IA has to be placed in the 5000 – 4000 BC time-bracket whereas Period IB belongs to ca. 1500 – 1400 BC. There is thus a hiatus of nearly two and a half millennia, a clear indication that the site was abandoned about 4000 BC and was again reoccupied

by a new people sometime in the first half of the second millennium BC. There is thus culturally no relationship between the people of IA and IB. Unfortunately this hiatus is not represented in the stratigraphy, but in such cases there is a possibility of a very thin weathered layer, hardly 1-2 cm thick which may be present.

There is such a huge hiatus between the two phases of Period I at Laburadeva that they cannot be coupled together in one cultural period. Rather Phase IB appears to be more closely related to period II for the simple reason that all the ceramics and other cultural elements of IB continue in Period II which in addition has painted pottery, red, black and BR wares. They both can be taken, as one cultural period representing the Developed Farming stage dated to 2100-1400 BC, which is in keeping with evidence from other sites in the region (Singh 2000 – 01). One notable feature of this period is the total absence of iron. Could these people be the contemporaries of the Kashiraja, referred to in the *Rigveda* as they very well fit into the time frame of the *Rigveda*, with barley cultivation dominating?

Conclusion

The foregoing analysis of the evidence from recent excavations in the Middle Ganga Plain makes it amply clear that, to a considerable extent, it is corroborated by that of Vedic literature. The picture that emerges reveals that the settled life began in the region in the fifth millennium or even earlier when people lived in modest round huts, used handmade pottery and cultivated rice. These first farmers may be tribals like the Kikatas of the *Rigveda* who have been said to be relying more on pastoralism. They seem to have abandoned their habitations by the fourth millennium for reasons not known to us. In this context it may be pointed out that the earliest settlement at Mehrgarh (Pakistan) belonging to the 6th millennium (Stage I consisting of Periods I – II, Neolithic) has been found to have some biological affinity with those in the Ganga Valley (Possehl 2002:35). This observation of biological anthropologists is significant and needs further probe.

A new group of people appear at the site sometime in the beginning of the second millennium, who were a chalcolithic folk whose culture was characterized by mud architecture, wheelmade pottery, cultivation of barley and wheat, and the use of stone and bone tools and copper. They may be the people who came with Videgha Mathava of the *Shatapatha Brahmana*, which is supposed to be a very early work, not much later than the Rigveda. They cleared land by burning and were the pioneering colonisers

at some places whereas at some sites, which were already occupied by Neolithic farmers, they lived with them amicably. The use of iron was thus far taken to be the prime mover of the second urbanization, but these early farming communities could not attain the urban status in spite of it. They remained poor agro-pastoralists for over a thousand years for which drastic changes in climate towards aridity appear to have been largely responsible (Dhavalikar 2002).

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The Interaction Networks of Pre/Early-Harappan Gujarat

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The Chalcolithic cultures of Gujarat spanning over a period of two thousand years or more, cannot be studied as a homogeneous cultural phenomenon as the cultural assemblages are varied, and include the Pre/Early-Harappan between 3500-2500 BC, Mature Harappan between 2500-2000 BC, and the Post/Late Harappan after 2000 BC. Till about a decade ago it was believed that the Chalcolithic settlements in Gujarat started only with Harappan colonisation (2500-2200) (Dhavadikar 1992), but recent excavations of sites like Nagwada (Hegde *et al.* 1984-85), Padri (Shinde 1992), Prabhas Patan (IAR 1971-72, 75-76, 76-77), Dholavira (Bisht 1989 and 1991), and others have brought to light earlier material going back to the 4th millennium BC that shows the existence of both well-developed farming and pastoralist communities before the Mature Harappans arrived from Sindh as well as others that continued after their subsequent decline.

The discovery of some new types and shapes in the ceramic assemblage as well as other non-Harappan material in an otherwise Harappan assemblage at various sites such as Lothal and Rangpur after 2500 BC (Rao 1963) emphasised the regional nature of the civilization (Thapar 1985). The excavations at Dholavira, Padri, Prabhas Patan, and Nagwada recognised the presence of

non-Harappan Chalcolithic cultures that were contemporary and sometimes earlier than the Harappan Civilization in Gujarat. The C¹⁴ dates of some of these non-Harappan sites take them to the second half of the fourth millennium BC making them earlier than the Early Harappan period. The excavation at sites like Langhnaj (Sankalia 1965) and Loteshwar (Sonawane and Ajitprasad 1994) prove the existence of Mesolithic communities that predate the local Chalcolithic tradition; significantly, at Loteshwar, Mesolithic gradually evolves into Chalcolithic. It can be surmised that these communities had a symbiotic relationship with interaction of ideas and goods for mutual benefit as is evident in the archaeological record.

Most scholars believe that the domestication of plants and animals spread to major parts of western Indian subcontinent from the nuclear site of Mehrgarh located near the Bolan Pass in Baluchistan where it first appears around 7000 BC (Jarrige 1981 and 1984; Asthana 1985, Shinde 2002). Recently Mesolithic Bagor in south-eastern Rajasthan has produced evidence of local transition from hunting-gathering to origin of domestication of plants and animals (Sinha 2003; Shinde *et al.* 2004). The aceramic phase has been dated to 5680 BC and the beginning of ceramic phase is dated to 4490 BC by C¹⁴ dates. The

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evidence of flimsy structures, coarse pottery (Plate 2), few food processing equipment and the tools suggests that the Mesolithic people had a semi-sedentary life, where they occupied the site for a considerably lengthy period but probably moved to another place for a certain period in their annual cycle (Shinde *et al.* 2004).

The site of Langhnaj in Gujarat also revealed similar features where phase I is aceramic and dated to around 2500 BC and the second phase has been described by the excavator as a Chalcolithic phase dated to 2000 BC and after (Sankalia 1965). This date is based on the similarity of copper and Black-and-Red Ware with the artefacts of the Ahar culture dated to 2000 BC (Sankalia *et al.* 1969). The single date from the site is from a mixed stratum and cannot be used to date the site objectively; however, on the basis of relative dating and comparison of the material from the site of Bagor (Shinde *et al.* 2004), phase I at Langhnaj (Sankalia 1965) can be equated with the aceramic phase at Bagor or slightly later. Based on this probable assertion the phase II at Langhnaj can be compared with the ceramic phase at Bagor and dated to around 3000-3500 BC as the Ahar culture has its beginning around the same time. A few dates from the site of Balathal go back to 3700 BC (Misra and Mohanty 2001), and the site of Langhnaj has yielded copper and Black-and-Red Ware both pointing towards contact with the south-eastern regions of Rajasthan. Thus, though the first phase is completely aceramic Mesolithic, in the second phase, aceramic Mesolithic has some amount of Chalcolithic contact especially with the Ahar region on the basis of pottery (Plate 2) and copper (Sinha 2003).

Loteswar, in North Gujarat (Mehsana District), gives the evidence of earlier beginnings of Anarta tradition (Sonawane and Ajitprasad 1994), even before the Harappans. The site has an undated aceramic Mesolithic stratum followed immediately by a Chalcolithic deposit with pit dwellings, pottery (gritty red, fine red and burnished grey/black), steatite beads, shell bangles and beads. The Chalcolithic level here has early dates of 2915 and 3693 BC and indicates that they evolved directly from

the Mesolithic communities with internal development as well as outside influence from the regions of Sindh and Rajasthan (Sinha 2003).

Thus it can be categorically argued that Gujarat was inhabited by a Mesolithic population in the 4th millennium BC. Soon thereafter, animal and plant domestication was introduced alongwith pottery by 3500 BC as outside influence grew (Sinha 2003). The evidence of Mesolithic habitation from sites like Loteswar and Langhnaj indicates the presence of human traditions in the region and their interaction with the incoming pastoral/nomadic hunter-gatherer groups or cultural influences and to a certain extent incorporation and assimilation of the people and their ways of living within their own cultural group.

In Gujarat the first evidence of non-Harappan ceramics were found at Lothal where Micaceous Red Ware and Black-and-Red Ware are found from the Pre/Early Harappan through Post/Late Harappan levels. S.R Rao, while reporting the presence of these wares wrote, "the exuberance of the Micaceous Red Ware in the early levels and its strong influence on the Harappan wares suggest that the Micaceous Red Ware folks were indigenous to the soil and had attained a fairly high level of economic development" (Rao 1979:23-25). Later, excavations at sites like Dholavira, Nagwada, Prabhas Patan, Padri and the sites of North Gujarat also brought to light earlier material. Hence, today, the Anarta, Pre-Prabhas, Padri phase I, and Early Harappan culture of Dholavira are said to have existed in Gujarat before the Harappans. During this period, pastoral and farming village communities probably co-existed with Mesolithic hunter and gatherer communities with a lot of cultural diversity. The North Gujarat Anarta tradition, the Nagwada cenotaphs and the Padri material seem to be related to the Amri/Nal complex. The Pre-Prabhas material is completely different from these as well as from the Kutch Early Harappan as seen at Dholavira Phase I. Micaceous Red Ware though not reported as a separate tradition from the Harappans at any site appears to be both a separate and older regional tradition from the Harappans. Scholars (Dhavalikar and

Possehl 1992) have identified "as many as four strands of cultural historical material documented in Pre-Harappan Gujarat, each with its own origins, each more-or-less independent of the other" but it seems that except the Prabhas material there is a lot more similarity than has been portrayed in the cultural assemblage of Pre-Harappan Gujarat taking it back to the cultures of Sindh (Sinha 2003). Recalibrated C^{14} dates from Padri go back to the 4th millennium BC (Possehl 1994) making them upto 1500 years earlier than the Mature Harappans. Meanwhile the Harappans, once believed to have entered Gujarat only around 2500 BC have been shown by the excavations at Dholavira (Stages I-III) to have had a considerable presence in Kutch as early as 3000 BC with elements of both Amri and Kot Diji cultures suggesting extensive trade networks even in the pre-2500 BC period between Gujarat and the Indus flood plains (Sinha 2003).

Saurashtra

Evidence of a Pre-Harappan Chalcolithic occupation unearthed at the Prabhas Patan excavations (Nanavati *et al.* 1971; IAR 1955-56, 56-57, 71-72, & 75-76; Dhavalikar, 1992) revealed the presence of regional Chalcolithic elements in the lower two levels of Pre-Prabhas (3000-2800 BC) and Prabhas (2200-1700 BC) cultures. The third phase at the site is represented by the Late/Post Harappan Lustrous Red Ware (1700-1400 BC). The Pre-Prabhas level is characterized by microlithic tools and ceramics including Red, Incised Red, Black-and-Red Ware and grey wares, all excepting the Black-and-Red Ware are coarse-grained and handmade (Plate 2). The red ware is handmade, has a smooth surface, a coarse fabric and is mostly represented by wide-mouthed jars. The incised red ware has no slip, is drab red to grey in colour, and has incised decorations in bold strokes and shapes that include deep or shallow basins. The grey ware is also of the crude and handmade variety, has a greyish or drab red surface and common shapes include wide-mouthed jars and a few vessels with flat bases. Black-and-Red Ware, though found in restricted quantities, is comparatively fine in fabric, is slipped and burnished on

the outer surface and probably on the inner surface in case of wide-mouthed pots; while shapes include wide-mouthed jars, *handis* and vessels with ringed bases. Steatite micro-beads and faience beads as well as wattle-and-daub structures were reported from this level dated to 2892 and 2911 BC (Dhavalikar 1992). A hiatus marked by a flood deposit separates this and the succeeding Prabhas phase.

Padri (Bhavnagar District), excavated by Deccan college (Shinde 1992; Shinde and Kar 1992; Shinde 1998), is a large site measuring about 20 hectares. The lower levels at this site have a non-Harappan ceramic and the occupation has been dated to second half of 4th millennium BC or 3636 BC (Possehl 1994). This early occupation has been identified as the Padri culture and is contemporary with Pre-Prabhas culture of Prabhas Patan. The people of this phase lived in wattle-and-daub houses, used copper and locally manufactured lithic tools. Besides the pottery, this Pre-Harappan level also yielded a large number of micro-steatite beads similar to those of the Harappan type, one globular bead of carnelian and few short chert blades (Shinde 1998). The typical pottery of the Padri culture is the Padri ware (Plate 3) (Shinde 1992a, 1992b; Shinde and Kar 1992), a coarse, wheel-made ware of both thick and thin variety. Chopped grass and sand is added as tempering material and the ware is ill-fired. It has a thick red slip on the outside and inside (in the case of large wide-mouthed jars/pots) that tends to crack and is similar to the Savalda ware which may have been influenced and derived from the Padri ware because of the close proximity of the two regions. The ware is rich in linear and geometric painted decorations in black and in some cases white pigment. The most common shapes are convex-sided bowls, globular pots and few sherds of perforated jars and dish-on-stands. The thin variety is made of fine clay and is well-fired with decorations in black and in a few cases with white and light brown (*jali* patterns) indicating a polychrome tradition. The other types include a pink-slipped ware painted in black represented by globular pots; White Lustrous Ware of fine variety that is well fired, with a white slip on the exterior

and a red slip on the interior, decorated in grey colour and dominated by globular vessels; Bichrome ware of coarse variety treated with red slip painted in black decorations and a white wash on top of it as the decorations appear to be hidden under the wash (Shinde 1998:179); red painted ware of thick and thin variety decorated in black; plain handmade ware and white painted ware with a dark brown slip.

Interestingly the Pre-Harappan Padri ware is very similar to the Gritty Red Ware of north Gujarat (Shinde and Kar 1992; Sonawane and Ajitprasad 1994), which in turn has its roots in the Amri-Kot Diji tradition, pointing towards the probability of a single point of origin and similar traditions. The Padri ware, a red ware in both coarse and fine fabric and decorated in white, red and black pigment with shapes like dish on stand, large number of bowls, perforated jar and stud handle bowls shows outside influences. The other wares like the pink-slipped ware with paintings in black or brown, white lustrous red ware, bichrome ware at the site also show similar polychrome and bichrome traditions taking them back to the Sindh region. No other site in the region has given any evidence of this ware, and according to the excavator it is possible that Padri ware indicates a local and indigenous culture that later influenced and mingled with the Harappans

around the last quarter of the 2nd millennium BC (Shinde 1992). However, it seems plausible that this cultural tradition with certain readymade technological features like the introduction of ceramics and the use of copper came from outside and settled in the region of Padri with local people and culturally adapted the matrix/environment in which this tradition developed (Sinha 2003).

The other wares important in this region at this time are Micaceous Red Ware and Black-and-Red Ware found in the lower levels at Lothal and Rangpur (Rao 1963, 1979). Micaceous Red Ware has never been found independent of the Harappan stratum and while some scholars have put forward the view that it was a regional innovation of the Harappans in Gujarat, it is generally believed to represent an independent Pre-Harappan occupation as its quantity increases in the lower levels at Lothal (Rao 1985). Rao, in fact, believed that the Micaceous Red Ware people were the indigenous settlers of the region who later interacted, co-existed, and were later co-opted by the urban Harappans (Rao 1985). Micaceous Red Ware is well-fired with a smooth burnished surface reddish or orange-red in colour and decorated in black with simple straight or wavy lines and hatched diamonds (Fig.1). The most prominent shape in



Fig 1. : Micaceous Red Ware

Micaceous Red Ware is the hemispherical stud-handle bowl with an incurved rim and rounded bottom and is the type that defines the Sorath Harappan assemblage, while bowls without the stud-handle and small and medium sized pots are also common. The fact that shapes like the stud-handle bowls were not a part of the original Harappan assemblage outside Saurashtra and were copied during the Harappan Period in Harappan Red Ware and Black-and-Red Ware also supports the idea that it was the Harappans who copied this shape when they came into contact with the native Micaceous Red Ware using people of Gujarat. The date for Micaceous Red Ware at Lothal may go back to before 2500 BC, implying that it is one of the early indigenous Chalcolithic ceramic traditions in Saurashtra, also being contemporary with the Harappan and Sorath Harappan (Sonawane and Ajitprasad 1994).

Black-and-Red Ware, in contrast to Micaceous Red Ware, is definitely much older as it is present in the Pre-Prabhas levels dated to 3000 BC and is the fossil pottery of the Ahar culture of southeast Rajasthan where it is believed to have originated from and has been found to date to before 3000/3700 BC at Balathal (Misra and Mohanty 2001). It is a common ware that most Harappan and Chalcolithic sites incorporated at some stage and it is generally made of fine clay with a smooth and burnished outer and inner surface with decorations like lines and dots drawn in white pigment. Typical shapes include wide mouthed bowls, basins, small pots and jars; while stud-handle bowls are also found in the later periods and several shapes of the Black-and-Red Ware are similar to the red and buff wares of the Harappans.

North Gujarat (Anarta)

The North Gujarat region was considered to be hostile for human occupation in the Chalcolithic period because of its harsh environment (Plate 1), but with the discovery of Harappan sites (Hegde and Sonawane 1986; IAR 1978-79, 82-83, 84-85) and the local Anarta pottery tradition the region has become important in the study of the cultural dynamism during the Pre/Early, Mature and Post/Late

Harappan periods. Our understanding of the non-Harappan cultural tradition in North Gujarat is based on the study of habitation and burial pottery from sites like Nagwada, Loteshwar, Santhli, Modi Pipli (Sonawane and Ajitprasad 1994), and others and it is important to keep in mind that the burial pottery is very different from the habitation pottery. It is possible that these represent either two separate traditions existing simultaneously in North Gujarat during the Pre/Early Harappan period or they belonged to a group of people who differentiated between their living and dead traditions (Sinha 2003).

The evidence of Mesolithic habitation from sites like Loteshwar and Langhnaj indicate the presence of human traditions in the region and their interaction with the incoming pastoral groups from the Amri-Kot Diji region and southeast Rajasthan and to a certain extent incorporation of the people within their own cultural group (Sinha 2003; Shinde *et al.* 2004). Loteshwar in North Gujarat (Mehsana District) gives the evidence of earlier beginnings of Anarta tradition (Sonawane and Ajitprasad 1994), with pit-dwellings, pottery (gritty red, fine red and burnished grey/black), steatite beads, shell bangles and beads. The Anarta phase at Nagwada has been identified as part of the Amri-Nal-Kot Diji complex with Gritty Red Ware and the typical Amri pottery from the burials (Sonawane and Ajitprasad 1994).

The habitation pottery includes Gritty Red, Fine Red, Burnished Red and Burnished Grey/Black Wares. Among these the first is the most predominant type and all four continue right into the Late/Post Harappan Period as a part of the larger Harappan tradition or as the Anarta tradition (Ajitprasad and Sonawane 1994). All the pottery types except Black-and-Red Ware share common traits and decorative schemes pointing to a single pottery tradition that may have existed in this area over a long time scale. Gritty Red Ware (Plate 3) is a coarse ware with a lot of tempering material or sand, either handmade or modelled on a slow turn-table, treated with shades of red slip, chocolate slip or light wash and painted in shades of black and red on a white or cream base producing a

bichrome effect or just decorated in black pigment. Designs include simple lines, loops, latticed circles and squares executed over the rim, shoulder or body either as panels or individual patterns. Shapes include bowls with straight or convex sides and slightly incurved rims, flared rim basins, pots, jars and Harappan shapes like the dish-on-stand and perforated jars in the later periods. Many features of this ware are similar to Padri ware (Shinde 1998; Shinde and Kar 1992; Sonawane and Ajitprasad 1994), and other sites like Surkotada and Desalpur also have evidence of a coarse red ware that is similar in generic characteristics to Gritty Red and Micaceous Red Wares. Fine Red Ware in contrast is made of well-levigated clay containing mica particles and shapes are similar to those in Gritty Red Ware, while the Burnished Red and Grey/Black Wares have a smooth burnished surface and are represented by small pots and jars (IAR 1988-89) and the Black-and-Red Ware is represented by small bowls and sometimes stud-handle bowls. The decorations on the red ware are done in white or bluish grey pigment over black background, while grey ware has white decorations. It is

interesting to note that the Gritty Red and Fine Red Wares have similarities with non-Harappan polychrome, bichrome and coarse red wares from Surkotada and coarse red ware from Lothal (Hegde *et al.* 1988).

In North Gujarat, the Chalcolithic dimension as mentioned above is also identified by a burial culture. A number of extended inhumations and ceremonial pot burials have been located at sites like Nagwada, Samthli, Moti-Pipli and Datrana (Sonawane and Ajitprasad 1994). The burials are located sometimes within the habitation area like at Nagwada (Hegde *et al.* 1988: 58) and contain between two to five pots and in case of ceremonial burials between six to ten pots. The burial pottery types (Fig. 2) (within the burials) include a red ware, pinkish buff ware, and grey ware, different from the Harappan and the regional pottery. It is made of well-levigated fine clay, slipped and painted which has now peeled off completely with shapes including large bulbous pots with a short straight neck and a flat rim, flask or beaker shaped vases with narrow openings, beakers with flaring rims, dish-

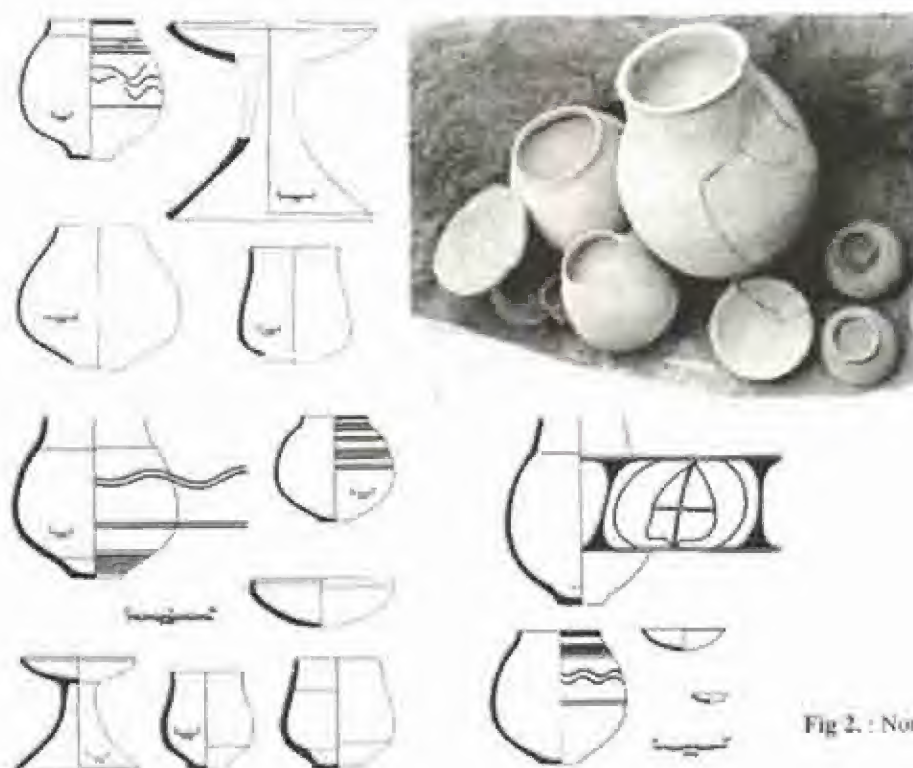


Fig 2. : North Gujarat Burial Pottery

on-stand, dish without carination and bowls. These shapes do not resemble the Harappan wares but rather the pre-Harappan vessels (Sonawane and Ajitprasad 1994) from Kot Diji (Khan 1965), Amri (Casal 79), Balakot (Dales 1974), burial pottery at Nal and Damb Bhuti (Piggott 1952), cemetery at Surkotada (Joshi 1990) and are comparable to the pre-Harappan burials from Sindh and Baluchistan. "The Nagwada cenotaph with the Amri pottery, is then a part of the larger Harappan cultural tradition and assigning it to the Early Harappan, as defined by Mughal (1970) is quite appropriate" (Dhavalikar 1992).

Interestingly, excavations at Moti Pipli and Mathutra in Banaskantha (Majumdar 1999) yielded burial pottery in the habitation layers besides the burials (Sonawane and Ajitprasad 1994; Majumdar 1999). The site also has some shapes similar to that from Pre-Harappan levels of Kot Diji. Also at Datrana the upper levels of the Pre/Early Harappan phase have yielded the Pre-Prabhas wares (Majumdar 1999).

To take a clue from Post-Processual or Ideational Archaeology, it can be said that since rituals play an important part within the social structure of a community, the choice of burial pottery would in essence be a symbolic statement, and the pottery chosen for this will be having significant traditional association. In the present context, the burial pottery is typically from the regions of Sindh. This suggests that since the Amri pottery is found within these burials, the roots of these people may go back to the Sindh region (Sinha 2003). In the later phase, the Gritty Red Ware and other types dominate and the Amri tradition assimilates itself completely with the new developing Chalcolithic traditions implying a weakening of the bonds that connected the people to Sindh and Amri culture (Sinha 2003).

Kutch

Interesting evidence of a Pre/Early Harappan settlement or tradition comes from the site of Dholavira in Kutch, the only site to give such evidence in the region

(Bisht 1989). The 100 ha site with a 12 m thick Harappan deposit has a 60-70 cm thick Early Harappan occupation at the bottom. The excavator believes this deposit as an early stage leading towards the urban Mature Harappan (Bisht 1994). The Early Harappan levels are represented by a variety of non-Harappan ceramics and according to the excavator, "the ceramic pieces, too meagre for a meaningful study... represent diverse fabrics with equally diverse surface treatment" (Bisht 1991). The majority of the pottery is wheel-made, with red to shades of pink slip, and painted in dark or white colour to emphasise the design. Combed, incised and Reserved-slip Ware is present and the painted designs in white are like those from Amri, Nal, Kot Diji and Sothi complexes. Copper working and tools was known (Bisht 1993) and the remains of structures built of mud-bricks as well as a fortification wall were present. This early stages show temporal and cultural affinity with the Amri IIB, Nausharo-ID and Kot Diji-I (Bisht 1993). Though this phase is not dated by C¹⁴, it can be easily dated to the beginning of 3rd millennium BC, comparable to the Nagwada burial tradition and Pre-Prabhas and Padri culture of Saurashtra. Their contacts with the cultural traditions in Saurashtra and North Gujarat were either direct or through the hunting-gathering nomadic communities as the medium for exchange. The need for direct expansion into these regions was probably not experienced until the external trade requirements got a boost from West Asia.

Kutch does not have any evidence of prior human occupation in the Mesolithic or earlier phases and the presence of the typically Amri-Kot Diji cultural assemblage at Dholavira is an example of implantation of a new culture. The region of Kutch was thus one of the earliest direct expansions/colonisations by the Early Harappans and this was categorically for the expansion of their pastoral interests and in developing their trading interests for acquiring raw materials like semiprecious stones. All the features like use of mud-bricks for construction, fortifications, drains, etc., from the Indus flood plain are found at this site and it is from this typical cultural assemblage that they expanded later in the mature

phase into Western Saurashtra at Nageswar, Lothal, and Kuntasi which have a similar tradition as the Harappans of the mainland. Sites like Padri, Prabhas Patan and the Anarta sites are more village-based with pastoral and agricultural subsistence and probably go back to the early days of migrations from Sindh in search of pastoral land and resources before the colonisations of Kutch.

The pre-Harappan levels from Amri, Kot Diji and Balakot are dated between early 4th (Mujumdar 1999) to first half of 3rd millennium BC (Possehl 1994). These dates have an important bearing on the cultural history of the period in the region as scholars have tried to trace the movement of the pre-Harappans and their extension from Sindh and Baluchistan, southwards into Gujarat (Hegde *et al.* 1988: 62). In the beginning the pastoralist expeditions were seasonal but slowly with increasing benefits and convenience they started settling down in the area and mingled with original agricultural communities from that of Prabhas Patan, Padri, etc., and hence some of the features of Sindh cultures can be explained in this phase just as will be seen in the Sorath Harappan phase when the Mature Harappan and Chalcolithic communities intermingle. It is just that the influences are stronger and easily discernable in the later period.

Dhavalikar and Possehl (1992) believe that the Gujarat environment in that time frame was a sandy savannah type with large stretches of grassland and pastures with acacia trees and various small and scattered hunting gathering communities. These pastures in Gujarat attracted the Early Harappan cattle herders from Sindh towards east and south along the northern edge of the Rann of Kutch or perhaps across in the dry season (Possehl and Dhavalikar 1992). This region was probably well-known as a source of raw material, as shown by the presence of carnelian beads at Mehrgarh much before the beginning of 3rd millennium BC (carnelian was imported only from Gujarat throughout the Harappan period). In the beginning the pastoralist expeditions were probably seasonal but slowly with increasing benefits and convenience they

started settling down in the area and mingled with indigenous agricultural communities like those at Prabhas Patan, north Gujarat, and Padri thus explaining the Amri, Nal and Kot Diji elements present during this period.

Origin of Cultures: A Ceramic Analysis

Ceramics have been the major features for studying archaeological interactions, culture change and culture differences. Scholars have used various minor details in ceramics to differentiate and create various cultural groups isolated from each other in form and feature. Based on the data from excavated sites scholars have portrayed a variety of regional traditions before 2500 BC within Gujarat, but the difference seems more superficial than what has been portrayed. Kutch has elements of Early Harappan Sindh traditions. North Gujarat has a mixture of Early Harappan elements and the local people forming the Anarta culture, while in Saurashtra the influence of the Early Harappans from Sindh on the local communities cannot be ignored at Padri and Micaceous Red Wares. Prabhas Patan points to an indigenous culture with influence from southeast Rajasthan and Sindh.

The author here is trying to study the origin and interaction among the existing cultural traditions on the basis of ceramic similarities, since by tracing the availability and chronological movement of these ceramic types it is possible to distinguish cultural and may be some amount of demographic movement in the 4th and 3rd millennium BC. The region already indicates the presence of Mesolithic communities which probably through internal development and the influence from Sindh evolved as Chalcolithic communities with ceramic, agriculture, pastoralism and lithics. The ceramic types at these sites include the red ware with painted decorations in black with rare use of white pigment as fillings or base colours similar as seen at sites in the Sindh region in the Pre- and Early Harappan phase; a Black-and-Red Ware with paintings in white and the Reserved-slip Ware, both similar to the ceramics from south-east Rajasthan Ahar culture (Sinha 2003).

The period between the 4th and the mid 3rd millennium BC was a period of demographic increase which forced segmentation and fusion of various traditions leading to the spread of cultural traditions and ideas through a large geographical and chronological space. Occupational causes like search of pasture, agricultural land and raw material for demographic and cultural migration can not be ruled out either, as the agro - pastoral community, continuously on the move acquired new regions which in some cases were already inhabited by Mesolithic incipient settlers who accepted and emulated the new features leading to similar cultural features and artefact assemblages including ceramics. The basic ceramic tradition continued from region to region through time with differences in fabric, forms and decorative patterns depending upon the economic condition and the availability of materials and requirements of the society. This continuous movement or migrations led to an amalgam of people and ideas, direct implantation or just copying of ideas or emulation (Sinha 2003).

The Black-on-Red ware and the use of white pigments along with it as the bichrome ware is reported from the early Harappan traditions, and the Chalcolithic sites in Gujarat can be traced back to Sindh and Indus flood plains where it evolved in the Kot Diji, Ravi and Amri phase dating to the 4th millennium BC, and even earlier to Mehrgarh IIB (4300 BC) (Schaffer 1992). The Black-on-Red ceramic tradition along with the demographic and cultural influence moved southeast into north Gujarat and south into Kutch with local developments. It probably spread to these regions either through migration of people or just emulation of the technique from a more technologically developed cultural group (Sinha 2003).

The recent archaeological data has proved beyond doubt that there existed farming communities in Kutch, Saurashtra and North Gujarat much before the assumed migration of mature Harappans around 2500 BC. The ceramic study of these three groups indicate the presence of the Black-on-Red Ware typical of the Pre Early Harappan tradition of Amri-Kot Diji though with

considerable differences in the early levels which was more a result of ecological and local factors the most important of which was economic. These differences and aspects of economic subsistence lead to the formation of the Pre Early Harappans, local Chalcolithic cultures and the hunting-gathering Mesolithic communities with possible interactions of ideas and goods for mutual benefit. All the Black-painted Red Ware types share common traits and decorative schemes pointing to a single pottery tradition which existed in Gujarat as a result of influence from the west and continued till the post Harappan period indicating a continuity of cultural process.

The Gritty Red Ware, Pre-Harappan Padri Ware, Micaceous Red Ware are all in essence Black-on-Red Wares and bichrome wares, which have been identified as separate cultural traditions belonging to completely isolated groups of people. Scholars have noted the similarities between the Gritty Red Ware of north Gujarat and the Pre-Harappan Padri, whereas the Micaceous Red Ware as defined by Rao (1963) has fabric and form-related differences. However, in the light of present evidence, even the typical Micaceous Red Ware form of the stud-handle bowl is found in the Padri ware assemblage. Thus the variations among all these types are either related to the pottery form or fabric, which can be explained as the outcome of local clay variations, the available soil and the mica content in it (in North Rajasthan and Punjab, the Black-on-Red Ware has significant amount of mica) or particular need-oriented requirements, different food habits and economic capacity of the group of people using it.

Therefore, it is possible to trace all these back to the Black-on-Red tradition of the Amri-Kot Diji tradition of Sindh that has its origin in the Pre-Harappan Amri-Ravi phase and Chalcolithic Mehrgarh IIB dated to the end of 5th millennium BC. They migrated eastwards in search of pasture into north Gujarat around the end of 4th millennium BC influencing the Mesolithic communities or settling on virgin soil. These movements cannot be identified as organized migrations but are rather like trickling outflow of the people from the marginal areas of the core Pre-

Harappan people. In case of Kutch, the movement is more organized like that for creating a colony or outpost for outsourcing raw materials in the Early Harappan phase and pasture grounds which forms the base for the mature Harappan in Gujarat.

In north Gujarat, the migration of the people themselves cannot be denied as the burial pottery described has typical shapes and treatment, which was probably imported, or more likely the style was carried on and assimilated in the local tradition. If we look at the ideational concepts of any human culture we will realize that certain artefacts that are important to the culture are always a part of their ritual and burial systems and are copied generation after generation even if a lot of extra effort and input is required until the connections and memories among the new generation gets dimmer and slowly forgotten. This can be seen in the habitations of North Gujarat where the people still used Amri-Kot Diji pottery for burial, while changes had occurred in the every day ceramic based on the availability of resources in the region.

In the final analysis it can be put forth that in Gujarat the Amri-Kot Diji group as a result of segmentation from the parent body and fusion with the local communities of Mesolithic hunters and Neolithic incipient farmers created the Chalcolithic communities including the North Gujarat-Anarta tradition, Padri, Micaceous Red Ware people with influence on the Pre-Prabhas people. While Kutch was the well thought-out process of territorial expansion and the demographic movement of the people from Sindh and Indus flood plains.

The Incised ware as seen at Langhnaj has similarities with the 'incised pottery' from Ahar sites. The earliest date for this ware now comes from Bagor (Sinha 2003; Shinde *et al.* 2004) and though the site of Langhnaj has the same type of ceramic assemblage it seems to be a little later in date. On the basis of the available dates and spatial distribution of the ware its origin can be ascribed to the Mesolithic communities of Bagor, Langhnaj, and regions

around and copper moves along with it probably leading to an indirect contact with the Ganeshwar culture in north Rajasthan (Sinha 2003).

The Black-and-Red ware is the characteristic ware of the Ahar culture of southeast Rajasthan with origins dating back to about 3000/3700 BC (Misra and Mohanty 2001). Soon after its beginning, it spread to the other communities among the Mesolithic and Chalcolithic people as it is found at the Pre-Prabhas and Padri in Gujarat dated to the end of 4th millennium BC and at Langhnaj in north Gujarat in the Chalcolithic levels or the ceramic Mesolithic phase as described above. This contact was probably a result of movement of nomadic hunters or pastoralists and the need for raw materials like copper, which was exchanged for shell and semiprecious stones either directly or through these groups.

The Reserved-slip Ware is found in the Early Harappan phase at Dholavira and in the Padri culture phase at Padri, both dated to before 2500 BC. The origin of this ware is attributed to the Ahar culture with its earliest evidence from Balathal dating to around 3000 BC and before (Misra *et al.* 1997). It moved from this region into Gujarat with the other features along with the movement of the nomadic pastoralists (Sinha 2003).

Transaction and Interaction

The 4th and the 3rd millennium BC in western India and the Indus Valley as portrayed from above data is characterized by the presence of different groups of people, each at a different level of socio-economic and cultural development. Indus Valley and Sindh region (Amri, Kot Diji, Na), northern Rajasthan (Sothi and Ganeshwar-Jodhpura) and eastern Rajasthan (Ahar), north Gujarat (Anarta, Pre Early Harappan from Sindh), Saurashtra (Pre-Prabhas, Padri Pre Early Harappans) and Kutch (Pre Early-Harappans) was all occupied by several groups practicing agriculture and pastoralism using lithic tools with minor differences in ceramic assemblages. The other important group that played an important role in the

development of these cultures are the Mesolithic incipient pastoralists/agriculturists and hunter-gatherers. The rise of these agro-pastoral communities was the need of time and there existed certain amount of movement of the people, ideas and goods among them as they cannot be believed to be completely isolated communities. The Mesolithic hunter-gatherers continued to exist alongside, contributing in the exchange and interaction. Movement and interaction of ideas, goods and people resulted in certain similar cultural features that are also visible in the ceramic assemblages studied above. The rise of these cultures is a response to the social and natural environment and a result of cultural stability and culture change. They played an important role in the development of the Mature Harappans by contributing various features and giving an impetus for the development as a source of import for goods and may be ideas as well as a potential export market for luxury items, food stuff, and other perishable and non-perishable goods and ideas.

The exchange system during this phase not only consists of inter-household and inter-hamlet transfers of surplus subsistence goods produced within the area including foodstuff, domestic equipments, medicines and materials needed for rituals and industrial raw materials, some of these products also cross local barriers. Herders and cultivators supplement their diet with hunting and collecting and these products when gathered have wider distribution areas when redistributed via trade networks. At the regional level, there are a variety of niches with different resource opportunities varying from mountain ridges rich in game and minerals to offshore islands with marine resources and the products from all these zones are brought to and exchanged at regional levels that act as trade as well as redistribution centres. Even in the Pre/Early Harappan context, some of the desired goods such as carnelian, copper, lapis and shells were found often beyond the territorial and socio-political boundaries and methods were devised to acquire such goods by establishing different types of trading relations, possibly political alliances, even colonies like at Dholavira or migrations and amalgamation.

The Amri-Sothi influence on the Nagwada and other burial/habitation pottery is strong, but there is no direct trail of Amri sites from Sindh into Gujarat and is difficult to trace their movement in this region. However, scholars like Dhavalikar and Possehl (1992) believe that the Gujarat environment in that time-frame was a sandy Savannah type with large stretches of grassland and pastures with acacia trees and various small and scattered hunting-gathering communities. The pastures in Gujarat attracted the early Harappan (3000-2500 BC) cattle breeders and herders from Sindh who moved to the east and south moving around the northern edge of the Ranns of Kutch or even directly crossing them in the dry season (Possehl & Dhavalikar 1992). However the Rann itself at this time was either a marshy salt stretch or an arm of the sea with regular water and in either case uncrossable by pastoral herds and hence pastoralists would have to bring their herds to these areas via the northern coast of the Great Rann of Kutch (Sinha 2003). The knowledge of these regions were probably known to these pastoralists, because of the earlier journeys to these region in search of raw-material and their contact with the hunting Mesolithic communities who were knowledgeable about the sources. There is evidence of carnelian beads in Mehrgarh much before the beginning of the 3rd millennium BC, and that was one material only imported from Gujarat throughout the Early-Mature-Late Harappan period. In the beginning, the pastoralist expeditions were seasonal but slowly with increasing benefits and convenience they started settling down in the area and mingled with original Mesolithic communities.

Colonisation of Kutch on the other hand was a result of the early Harappans intentionally deciding to occupy the area as it lay opposite the delta of the Indus River, which granted access to the core regions of Punjab and Sindh. In addition, absence of any Mesolithic or earlier pastoral sites in the region prior to 3000 BC and then a sudden occupation of the region by a developed fortified settlement suggest intentional colonisation and not simple pastoral encroachments but the knowledge and the benefits of this colonisation would have been the result of the

earlier pastoral movements in the north Gujarat and Saurashtra area.

Scholars had noted the similarities between the Gritty Red and Fine Red Ware with non-Harappan polychrome, bichrome and coarse red ware from Surkotada and coarse red ware from Lothal (Hegde *et al.* 1988). But it was only after the excavations at Nagwada that the distinct non-Harappan traits of the pottery could be identified. Surkotada and Desalpur also have evidence of a coarse red ware, which is similar in generic characteristics to the Gritty Red Ware and Micaceous Red Ware. The coarse red ware from Lothal is similar to Gritty Red of north Gujarat and is found with the Micaceous Red and Harappan ware (Rao 1985: 393-407). At Surkotada the non-Harappan coarse red ware occurs in the early levels period 1A dated to 2500 BC along with the mature Harappan elements. In the succeeding period 1B, the non-Harappan ware outnumbers the Harappan pottery indicating a strong influence of the former local tradition also indicating to the fact that the local tradition that had evolved in North Gujarat region by the end of 4th and early 3rd millennium had reached the sites of Kutch like Surkotada which is located on the trade route connecting the important sites like Dholavira in Kutch to that of Saurashtra. In the second phase at Surkotada, the Black-and-Red Ware is also found in large numbers indicating a lasting influence from the Ahar region which had already filtered into Gujarat in the Pre/Early Mature phase as is seen from the evidence at Prabhas Patan, Loteswar and Langhnaj.

The Gritty Red Ware people probably belonged to the earlier group of people who migrated with their flocks to the region of north Gujarat much before the beginning of the 3rd millennium BC and the pottery was the local development on the Black-on-Red and Amri-Sothi polychrome and bichrome ware which dates to 3600/3800 BC. The early Harappan pottery from north Gujarat indicates a later movement of the people with their flocks who mixed with the earlier groups using the Gritty Red Ware and continued to use the typical early Harappan

pottery for special rituals as tradition always continues in the ritualistic context even though the local conditions force changes in everyday life. At the site of Dattana, Pre-Prabhas ware was found with early Harappan pottery from the upper levels of the site indicating that the early Harappan pottery continued even later into the mid 3rd millennium BC before the rise of the mature Harappan phase and shows their co-existence. Dholavira habitation ceramic from the early stage and Surkotada pottery from the burials (stratigraphic position not known but relate to the earliest deposit dating to 2500 BC) and habitation are similar to the early Harappan pottery of north Gujarat sites (Majumdar 1999).

It is sometimes very difficult to differentiate between the Gritty Red and the Early Harappan ware (Majumdar 1999) and this similarity might not have been a result of interaction but a shared and common ancestry (Sinha 2003). It is quite possible that the Pre-Padri, Pre-Prabhas and Gritty Red Ware using people belong to the same earlier tradition that adapted the local conditions but continued with the same style and tradition as in their original homeland and the Early Harappan burial and habitation pottery people came later and got mixed with them. The area of Kalibangan was further explored by Shinde (Majumdar 1999) who located sites yielding similar ceramic assemblage as that of north Gujarat burial pottery of the Early Harappans. Therefore, another possibility is that these people moved further southwards towards north Gujarat and were later than the Gritty Red Ware people. The evidence of the Surkotada burials dated to 2500 BC and the movement of Dholavira with same pottery also indicate to the later movement of these people in the regions of Gujarat later than the Gritty Red Ware people. Also the early Harappans were pastoralists, manufacturers or industrialists and traders for shell and they have copper in much larger quantity than that at Padri or Prabhas Patan indicating their later arrival and a better economy. Hence, the logical conclusion derived is that the Pre-Harappan people settled in the region as pastoralists and then locally developed the Gritty red ware for everyday use based on the local economic condition

and the knowledge brought with them. The Early Harappan movement of the people happened around the beginning of 3rd millennium and while the original traditions in ceramic continued for burials and other ritualistic purposes, they established themselves in north Gujarat, intermingling with the earlier Grity Ware people (Pre-Harappans). Thus some of the features of Sindh cultures can be explained in this phase just as will be seen during Mature Harappan phase when the Harappans and the Chalcolithic communities intermingle. It is just that the influences are stronger and easily discernable in the later period.

Besides ceramics artefacts like steatite beads, faience beads and copper objects at these sites indicate the presence of outside contact especially as there is no evidence of any local manufacture of these until 2500 BC at most sites. Also the technology for manufacturing this object came along with the Mature Harappan phase. Hence, a close contact with Rajasthan and Sindh region cannot be denied.

The Ahar culture was traditionally forwarded as a copper smelting/producing culture (Sankalia *et al.* 1969), but latest research proves this idea to be a far-fetched one, though it is quite plausible that a lot of copper ingots were imported from the Ganeshwar area and the objects were produced locally. Most of the sites in Gujarat in this period have also yielded copper artefacts like fish hooks, pin/nail, wire piece and corroded pieces from Moti Pipli, punch point for stone knapping from Datrana and other unidentifiable pieces from Langhnaj, Padri and Prabhas Patan. The Ambamata belt was traditionally believed to be the copper source for Gujarat that was exploited by the Harappans and the locals but now the Ganeshwar and Ahar area seems a more plausible answer.

Though steatite is found locally in the Aravalli hills and Gujarat, it was not mined or used by the local people. The steatite sources of the west, Gujarat and Rajasthan were tapped by the Pre/Early Harappans for manufacturing beads which are found in large quantities at all Chalcolithic

sites right from Mehrgarh period I. The evidence of local manufacture has not come from any of the Chalcolithic sites but there is ample evidence of it at Early Harappan sites of Sindh and Rajasthan from where it was traded with the Chalcolithic Pre/Early Harappan sites like Padri, Balathal, and Prabhas Patan, etc., by the pastoral groups.

Faience beads have been found at the Pre-Prabhas and Moti Pipli in north Gujarat again indicating a trade contact with the Sindh and lower Indus region as it is produced in large quantities in the region as can be seen from the evidence of Kot Diji. Carnelian beads, also a Harappan speciality and other semi-precious stones have been found at sites like Padri and Datrana.

Shell was an important industry right from the Pre-Harappan days and coastal Gujarat is rich in shell deposits and could have been one of the important items of trade with the Indus and Sindh region as a number of shell-working sites have been located at Datrana, Moti Pipli with beads, bangles and waste. Shell objects from this region was traded within, as evidence comes, from Loteshwar, Langhnaj, and Santhli I and Santhli II and also exported outside to Rajasthan Ahar regions as it has been found at early levels at Balathal. Terracotta cakes and biconical beads from Moti Pipli are similar to those from the Early Harappan period at Kot Diji, further indicating close contacts between the two.

Conclusion

Thus the study of Pre/Early Harappan Gujarat shows that in most parts there existed pastoral and farming village communities in the region along with hunter and gatherer communities as seen at Langhnaj, Loteshwar, Padri, Nagwada Prabhas Patan, Lothal, Dholavira, etc., even before getting influenced by the mature Harappan from Sindh and Baluchistan around 2500 BC and seem to have been influenced by the Pre/Early Harappans. The north Gujarat Anarta tradition and the Nagwada Cenotaphs along with the Padri culture and Micaceous Red ware show stylistic influence in form of either direct migrations

or technological; Dholavira points towards a probable direct relation with the Amri/Nal complex, while the Pre-Prabhas material is influenced by the Black and Red and incised ware along with some amount of local influence of the Black-painted Red Ware. The Micaceous red ware though has not been found as a separate tradition from the Harappans at Lothal, its ceramic variability and its dominance over the Harappan wares point towards a separate and older regional tradition in the region.

The study of these cultures in the early phase between early 4th and mid 3rd millennium BC indicates that the early farming communities or the Chalcolithic traditions of Gujarat are part of indigenous growth, but there is influence from outside from a more developed culture like

the Kot Diji and Amri from the Sindh region by the beginning of the 3rd millennium BC and even earlier at various intervals around the third quarter of 4th Millennium BC. The sedentary settlement pattern and agriculture was probably home-grown while the technology to some extent was borrowed. The need for living space led to the development of new settlements and peer polity type exchange networks between them (Padri, Prabhas Patan, Lothal, etc., as the pottery seems to have travelled) facilitated the procurement of goods not available locally in exchange for products locally produced. The presence of non-local copper objects, steatite beads and ceramics does however reflect the presence of trade with more developed communities.

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Bhorrana Excavation – 2005-06

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The excavation at Bhorrana (Lat 29° 33' N; Long. 75° 33' E.) in the Fatehabad district of Haryana was resumed for the third consecutive season with the following objectives:

1. An in-depth study of the Early Harappan and their antecedent dwelling pit culture along with its transformation to the full-fledged Mature Harappan culture.
2. Tracing of the eastern arm of the fortification wall and the gateways to facilitate the study of the town planning and its evolution at the site.
3. Tracing of the dividing line, if any, between the Citadel and the Lower Town.
4. Study of drainage system in detail in the light of the burnt-brick drain provided across the northern arm of the fortification wall.
5. An intensive effort to search for the Harappan cemetery.

To realize these objectives, 42 new trenches and 35 old trenches, which were partially exposed in the previous seasons, were subjected to digging. The excavation has reaffirmed the following cultural sequence arrived at the

site in the second season during 2004-05 (Pl. I).

Period IA:	Hakra Ware Culture
Period IB:	Early Harappan
Period IIA:	Early Mature Harappan
Period IIB:	Mature Harappan

Period IA

Partly excavated Dwelling Pit No.5 in the season 2004-05, which is located in the northern periphery of the mound, partly excavated in 2004-05 season, was reopened for further excavation. Besides, two more new Dwelling Pits belonging to the Hakra Ware Culture, numbered 13 and 14, were exposed in trench YF2. The diameter and the depth of the Dwelling Pit nos. 5, 13 and 14 measure 2.30 m, 2.0m and 2.96 m and 1.10 m, 0.52 m and 0.80 m respectively. In consonance with the prevailing practice of the period, the walls and floors of the said pits were also plastered with fine yellowish alluvium. The Hakra Ware Culture has a varied range of pottery repertoire. The pottery, usually made on slow wheel and sometimes by hand, has an appearance which is not very fine. The texture in general of the earlier repertoire is not very fine either; either in

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some instances the fabric appears to be rough rather than the medium. Usually well-fired, except the black burnished ware, the pottery has a dull look. The repertoire comprises Mud Appliqué ware, incised ware (including deep incisions as well as light incisions), Tan or Chocolate Slipped ware, Black Burnished ware, Brown-on-Buff ware, Bi-chrome ware, Black-on-red ware and plain Red ware.

In all these categories, the utilitarian shapes, viz. vases, bowls, globular-bodied pots with handles and cups predominate. Heavier shapes like storage jars, etc., too are not wanting. The main shapes in the Mud Appliqué ware category are storage jars and globular pots with flaring mouths and everted rims. The rims in case of globular pots are usually painted with chocolate or black pigment. The mud applied on the exterior is mixed with calcareous granules (erroneously in the last paper, calcareous granules were mistaken for quartz grits), which was perhaps added to further roughen the surface. The globular pots having thin sections were made on slow wheels and the storage jars having heavier and coarser appliqué than the globular pots, were handmade. The firing was mostly uneven resulting in a greyish red to red surface hue in case of the globular pots. The incised ware category at the site further comprised two varieties, viz. wares with deeply incised lines and wares with superficial or shallow incised lines. The shapes found in this category were *lota*-shaped pots and handled globular vases and bowls. The incisions in both the varieties were executed on the outer surface of the pot which is without any slip. The surface treatment, especially, in case of the deep incised ware, was often found to be undulated. Interestingly, the incised designs in both varieties were executed from the shoulder to the waist portion of the pots and these incisions were bound by black bands and parallel lines. It was observed that in comparison to the incised pottery, the mud appliqué category of wares predominated till the last. The incised variety has been found to be in continuous use all throughout the succeeding periods, up to the Period IIB at the site, though in a much modified version. The Tan or Chocolate slipped ware showed some minor variation which was evidenced in the execution of slip and painting. It was found that pots with

chocolate slip covered up to the base, had a thick black band painted on the internal surface of the rim. Sometimes this black band is replaced by vertical strokes. Whenever the chocolate slip was executed up to the shoulder or belly, the rim did not show any black band. The common shapes seen in this variety were globular pots, straight-sided vases and bowls. This category of pottery persisted through all the periods at the site with subtle changes in later periods. The sturdy Black Burnished ware repertoire is represented by straight-sided bowls and vases, which are usually thick sectioned. The clay used for this ware was very well levigated and well-fired, and bore a distinct sheen. The fragments of Brown on Buff pottery found in miniscule quantity, do not represent any shape. The Bi-chrome ware too, was represented by a handful of sherds, of which the shapes could be made out to be mainly vases and bowls. White pigment was used essentially as filler in some of geometric and floral (pīpal leaf) designs executed in black. The red ware comprised the major bulk of the entire repertoire. In fact, the Mud Appliqué, Incised and Tan Slipped wares also are variants of this and are essentially red wares. A few of the plain red ware bear paintings in black, the design elements being geometric in nature. The small vases, globular pots, bowls and cups were found to be painted and the large vases, pots or storage jars were plain. The painted shapes were essentially slipped whereas the plain ones were devoid of slip.

The other material remains of the period comprised micro and disc beads of steatite, a solitary micro bead of lapis lazuli and fragments of terracotta bangles. Though large number of crucible fragments with molten copper still sticking to them had been recovered from various dwelling pits in the previous seasons, no objects of copper was reported. But this year, a copper bangle was collected in Dwelling Pit no. 5. Besides, considerable quantity of charred bones was collected from this level.

Period IB

The succeeding Early Harappan Culture witnessed a significant transformation so far as the structural activities

and material vestiges are concerned. The habitation was expanded and the entire site came under occupation. It was probably an unfortified settlement as no defence/fortification wall has come to light so far. However, two structural phases could be discerned. The houses were built of mud bricks in the ratio of 3:2:1 and measured 45x 30x 15cm; 42x 28x 14cm and 39x 26x 13cm. No complete house plan could be exposed due to the usual constraints like overlying deposit of the subsequent periods. However, the extant walls of the houses show one to three courses of mud bricks bound by mud mortar.

All the six fabrics of Kalibangan I characterize the ceramic assemblage of the period. However, buff ware (fabric F) occurs in very limited number. The shapes in fabric D are mainly deep bowls, troughs and basins. They are partly handmade as shown by the dabber marks and rustication on the exterior. Whereas the inner surface is decorated with deep incisions; and the design elements include horizontal and wavy lines, loops, criss-cross diamonds and multiple arches. Some of the shapes bear the band of rice grains impression below the neck. The painting in black is confined to the rim only. The grey ware (fabric E) is well represented with shapes of small vases, jars, deep bowl, and bowl with blunt carination, dish, dish-on-stand and offering stands. Made of well levigated clay, these shapes are often burnished. The bi-chrome painted ware is mostly wheel turned and is of fine fabric and well – fired. The paintings are done over the dull red surface in black and white colour is used as filler. The painted designs include horizontal bands, loops, wavy lines, faunal and floral motifs such as fish and pipal leaf.

In the south central slope of the mound, the Early Harappan structures are exposed on the surface because of the destruction of the mound in the recent past and accompanied with heavy erosion of soil. A few circular pits within the extant house complex were excavated in this part of the mound. One of these pits yielded a complete female figurine of terracotta with bald-head, owl beak-nose and a single prominent breast (Pl. II; 5), and broken parts of unbaked clay female figurines (Mother Goddess?).

Altogether two heads (Pl. II; 1 & 4), five torsos (Pl. II; 6-10) and pieces of arms (Pl. II; 2 & 3) have been recovered from this pit. These figurines are hand-modelled and are unbaked. The anatomical features of these figurines are similar to those described above. The five torsos are quite different from one another, but for the fact that all these torsos terminate below the waist level—a feature which they share with those figurines of the Kulji Culture. One of these figurines has concave base; two with flat base and the other two, triangular base. Two of them are ornamented with pellets-girdle. The female genital is prominently shown with a perforation. The figurines having triangular base indicate as if the legs were joined together and stretched horizontally. An interesting feature to be noted is that these figurines bear two appliqué cross motifs formed out of slanting stripes of clay—each slanting group having three stripes on the front and rear side of the waist. Among the other mutilated limbs of these figurines broken arms are ornamented with armlets. Similarly, in another pit was found a charred skull of a bovid. The interment of these mutilated female figurines and charred bovid skull in the pits might be of ritualistic significance, and especially the latter represents the continued ritualistic practices of the earlier period. It might be recalled in this context that similar charred animal skulls were exposed in the Dwelling Pit nos. 7 and 8 of Period IA in the last year's work (Rao, *et al.* 2004-05:61).

The antiquarian wealth of the period is varied and comprised rod and arrowheads of copper, chert blades, beads of semi-precious stones, hair pins and bone point, bangles of terracotta (both plain and segmented), etc.

Period IIA:

The Early Mature Harappan period represents the gradual but perceptible transformation that took place from the Early Harappan to the succeeding Mature Harappan period. The entire settlement was reorganized and reoriented during this period. The city lay-out instead of oriented towards the cardinal directions, is 32° away from the north. The complete town was encompassed within a

fortification wall as indicated by the partially traced wall lying underneath the northern and western arms of the fortification wall of the Mature Harappan period. The concept of twin units of town planning, viz. Citadel and Lower Town also came up during this period wherein the former occupied the west-north-west part of the mound and the latter east-south-east part. The main entrances to the Citadel pierce through the middle of these two arms. A mud brick wall of 2.70 m width running east-south-west serves as a dividing line between the above said two units. Approach to the inner part of the citadel was probably through a flight of steps provided near the western end of the dividing wall where it abruptly terminates. Adjoining to this wall, a rectangular strip of open space is provided. The Lower Town also had a fortification wall as evidenced by the partly preserved portion of the extant eastern and southern arms. The other parts of the fortification wall are either eroded or destroyed by modern vandalism. Though no complete house plan of the period is exposed due to the superimposing Mature Harappan structures, the available evidences show that they were built of mud bricks of pinkish hue, with mud mortar. A house wall facing the street running southwest-northeast orientation has a number of postholes, which indicates that once there existed wooden posts to support the superstructure. Similar feature has been reported from the neighbouring site of Banawali (IAR 1987-88:33).

The pottery of this period shows the mixture of the Early Harappan and Mature Harappan assemblage along with the modified Hakra wares. In case of the latter, now, the slip on the Tan Slipped Ware is restricted to the waist portion only. Similarly, the incisions become finer in the incised wares. One of the interesting potteries is the poorly imitated variety of Reserve Slip Ware. Over the red surface of the pot is painted in black and it has been decorated with wavy incisions.

The antiquarian remains of the period are rich and varied in comparison to the earlier period. The outstanding finds of the period are two cache of beads of semi-precious stones kept in two miniature bi-chrome ware pots—one pot

contained 940 short, biconical carnelian beads, 40 circular shell beads, 17 short, biconical terracotta beads and 17 disc shaped lapis lazuli beads (Pl. III); and the other with carnelian beads, spiral copper rings, a copper bangle, 4 tubular faience beads, 1 broken standard biconical and 1 short, bi-conical beads of carnelian, unfinished beads and debitage of carnelian, chert and shell. In addition to the above, the other antiquities of the period comprise beads of agate, carnelian, faience, jasper, lapis lazuli, shell and steatite; arrowhead, fishhook, chisel, antimony rod of copper; bangles of faience and terracotta; chert blades; ball, marbles and net sinkers of terracotta, and a terracotta col.

Period IIB

The Mature Harappan period shows the culmination in the structural and material culture at the site. During this period too once again the city lay-out was partially modified as a result the deviation from the north reduces to 20°. However, utilising the already available portions of the fortification wall of the preceding period, Mature Harappans strengthened and enhanced the height of the wall by adding additional courses of mud bricks of yellowish colour. This coloured bricks were also extensively used for building the houses. But, now, the main entrances to the settlement were shifted from the centres to the corners of the fortification wall as exposed in the south-west corner of the fort wall during the year 2003-04 (Rao, *et al.* 2004: 22). During the current season also one more such an entrance gate, though in a highly disturbed condition, was exposed near the north-eastern corner of the fortification wall enclosing the Citadel.

A strange feature glaringly visible in respect of the lanes and by-lanes and thoroughfares laid during this period is that there is no uniformity so far as their width is concerned. At times they look like funnels with one end being wider and the other narrower depending upon the availability of the space. Two main streets—one running southeast-northwest on the south-eastern slope of the mound (Pl. IV) and the other southwest-northeast in the western side of the mound have been exposed. The

northeast-southwest street bisects the lower town and is about 2.80 m wide. It emanates from the southern arm of the fortification wall and joins the open space between the citadel and the lower town. The open space measures approximately 107.0 x 20 m. The main street in the citadel area runs east-west and is 4.0 m wide. The thoroughfare along the fortification wall is about 4.10 m wide and at times becomes narrower to 1.90 m.

The ceramic assemblage of the period includes red ware, light red ware, Black-on-Red ware and Grey ware. The slip, if applied, is commonly red—sometimes chocolate or purple. The common shapes are vase in red and grey wares, storage jar in red ware, S-shaped jars, dish and dish-on-stand in red and grey wares, perforated jars, convex sided and bluntly carinated bowls in red and grey wares, cup, cup-on-stand, basins in different sizes and ring stand in red ware. The typical S-shaped jars are externally (sometimes internally also) treated with creamy or red slip and exhibit paintings in black on the exterior with geometrical, floral and faunal motifs in vertical or horizontal registers. The overall painted motifs include simple bands, checkerboard pattern, simple or inverted triangles, loops, festoons, arch, intersecting circles, fish

scale, eye, four-petalled rosette, sun, pipal, neem, palm and banana leaf, fish, antelope (sometimes shown with prominent genital) and peacock (Pls. V and VI).

The important antiquities of the period include a broken rectangular seal of steatite with unicorn and legend; beads of semiprecious stones, shell and terracotta (Pl. VII); chert blades (Pl. VIII); animal figurines of bull (painted and bearing incisions) (Pl. IX; 1, 5-12), Unicorn with hump (Pl. IX; 3), fox with upraised ears (Pl. IX; 2) and a ram (Pl. IX; 4); bangles of faience, shell and terracotta; points and kohl sticks of bone; terracotta toy-cart frames and wheels (both plain and painted with spokes in low relief and paintings); weights of agate and sandstone. A good number of pestles in terracotta (Pl. X) have been reported from this period. These are cylindrical, triangular and trapezoidal in shape having coarse texture and use wear and tear marks. The copper antiquities include bangles, chisel, rings, rods, etc.

The palaeobotanical remains from the period include charred grains of wheat, barley and pulses. Large quantity of animal bones along with the cereals recovered from the period indicates the mixed dietary habits of the Harappans.

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Interpreting Rock Art

URMI GHOSH AND V.H SONAWANE*

Archibald Carlisle made the first discovery of rock art sites in the Kaimur ranges of Uttar Pradesh in 1883 (Carlisle 1885). Since then there is a long series of studies by many scholars in this fascinating subject. Prominent among these scholars were J. Cockburn (1883, 1899); Fawcett (1901), Franke (1903), Silberrad (1907), and Brown (1923). A grand new chapter of rock art research in India was unfolded by V.S. Wakankar (1962) who discovered Bhimbetka rock shelters near Bhopal in Madhya Pradesh, which stands out to be one of the best-known sites in the world with a large concentration of rock paintings. His legacy has been carried forward by many scholars whose combined efforts have also led to the foundation of Rock Art Society of India.

Regarding the circumstances in which rock art occurs in India, various proposals have been made concerning its meaning and functions. Still a lot remains to be done regarding interpretation of rock art. India is one of the three countries having the richest treasure of rock art in the world. However, in a quest to unravel the probable purpose and meaning of rock art the authors have kept in mind that rock art interpretation is highly speculative, for there is practically no living tradition that practises rock art in India.

Fortunately, owing to the global presence of rock art, which also exhibits thematic similarities, tentative conclusions as to the purpose behind rock art can be achieved by scrutinizing other indigenous cultures where there are traditions of rock art practice till date. There definitely lies a common thread to the practice of making rock art, which occurs in almost all geographical and temporal regions of human civilization, with plenty of similarities.

South African San Rock Art

In order to understand the purpose behind making of rock art, we will first put up a case study from South Africa where the San/Bushmen tribes practice rock art even today in the Drakensberg Mountains in Kalahari Desert. In the 1870s, a German linguist named Wilhelm Bleek had gone to southern Africa actually to prepare a grammar of the Zulu language (Williams 2002a). During his stay at the British colony of Natal where the Zulus lived, he came to know about the San community. Bleek was so intrigued with their language that he gave up his Zulu research and took the initiative to learn the San language. Together with the help of his co-worker Lucy Lloyd (also his sister-in-law) wrote more than 12,000 pages of notes on San rituals,

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myths and beliefs. Bleek and Lloyd had come to know that the Sans made rock paintings and engravings. It is from a San man named Dia Kwain that Bleek learnt of *gi: xa*, when the latter was shown some rock paintings from southern Drakensberg region. The first syllable of the word, 'gi' means 'supernatural potency and the second syllable 'xa' means 'full of'. Therefore it refers to a person, male or female, with supernatural potency. In the present times the internationally used word 'shaman' is an appropriate translation of the word 'gi: xa' (Williams 2002a: 139). It was the shaman's task to ensure the tribe's overall health and well-being by using dissociation and other experiences of altered states of consciousness. He/she had to assist the tribesmen in all sorts of activities like, achieving a good hunt, changing the weather or curing the sick by seeking help from the spirit world. The most interesting point is when these San men were shown some copies of rock paintings they could identify the shaman in the rock pictures.

Even today the San people believe in a spiritual realm that is inhabited by God and his family, His vast herd of animals, spirits of dead and strange monsters. It is these spirits who shoot 'Arrows of Sickness' into the living people. Therefore it is the task of the San shamans to activate their own supernatural powers and travel into the spirit realm in order to perform the curing task. This activity is performed at a 'Medicine', 'Healing' or 'Trance' dance, in dreams or at a 'Special Curing' only when a few people are present. Men, women, children and visitors can attend the dance. In Kalahari region today though there is only one standardized pattern of the dance, variations are present in further south region. Present day pattern is circular, with a fire lighted up in the middle. The fire is believed to be the source of potency. Around it women sit in tight circles with their shoulders touching. They sing and clap the 'medicine songs' that are believed to contain potency. Outside the women's circle, the men dance in another circle. They stamp along with the rhythm of the dance and accentuate it with the swishing sound of their rattles that they tie around their calves. They carry fly whisks (only during the dance) made of animal tails to

flick away the arrows of sickness. By use of prolonged rhythmic movement, audio driving, and intense concentration (along with swift and shallow breathing exercises), the shaman induces the altered state of consciousness and enters a trance. During the dance the female shamans in the San community sometimes rises from women's circle around the fire and join the men with more graceful steps and gestures. Dances begin light heartedly, but slowly gather intensity and by the night the surroundings are filled with the songs, sounds and cries of the shamans. During deep trance the shaman's spirits are believed to leave their bodies through the top of the head. It seems that the walls of the rock-shelters were thought of as a 'Veil' suspended between the world and the spirit realm. Shamans pass through this veil and on their return, bring with them revelations of what was happening in the world beyond. It seems likely that the shaman painted (though there is no evidence to suggest that only the shamans painted) the images coming through into the world of the living and the visions of the transformations they experienced in the spirit world. Therefore the walls of the shelters, along with the paintings of the shamans, become gateways that afforded ordinary people to access realms that they could not visit otherwise (Williams 2002a: 149).

North American Rock Art

Next, if we turn to North American rock art, ethnographic evidences of Chumash community who lived on west coast of North America, suggest that magic and supernatural power play a prominent role in most of their narratives (Blackburn 1975:23). In fact, dealing with Columbia Plateau region alone, James Keyser and Whitley (Whitley 2000) has listed 19 references in ethnographic reports to an association between rock art and shamanistic vision quests. For example, Ake Hultkrantz (Hultkrantz 1987) a member from a community called Wind River Shoshoni (Williams 2002a:167) who still live in some of their ancestral territories in the Wind River Valley and the Grand Teton, Wyoming, has described vision quests amongst the Shoshoni community which further corroborates our understanding, as they have direct

historical relationship with the rock art of that region. Some more ethnographic reports (Williams 2002a: 168) indicate that Native American people believed that rock images were made not by the quester (the shaman), but by the spirits commonly named as 'Water Babies,' 'Rock Babies,' or 'Mountain Dwarves'. These spirits were supposed to be a shaman's spirit helpers, which could only be seen in an altered state of consciousness. According to Maurice Zigmund (1986:406-07), amongst the Kawaiisu of south-central California, it is believed that a spirit named 'Rock Baby' dwelt in the rock and made rock paintings. Therefore, if one returned to a rock art site and found that more images had appeared since one's previous visit, they were said to be handiwork of a Rock Baby. If a person touched a rock painting and then rubbed one's own eyes, sleeplessness and death could result. Thus, they believed that the images possessed inherent power and were not merely pictures.

In 1920's, Glenn Ranck found that one night a Wishram medicine man (shaman) used an unseen power to paint a pictograph during the night. He was found in a trance at the foot of the pictograph the next morning (Keyser and Whitley 2000: 20). Therefore these reports help us to realize the link between North American shamans and rock art.

However, based on ethnographic reports, we should also keep in mind that it was not just shamanistic visions that led to making of rock art in North America, as we see in Southern California puberty ceremonies culminated in rock paintings (Williams 2002a: 170). In these rituals in Southern California, boys and girls learned religious and moral truths and correct behaviour. They also ingested hallucinogens, e.g., boys had jimson-weed and girls took tobacco. At the climax of the rituals the initiates took part in a race to a designated rock. The winner of the race was believed to enjoy longevity. After the race, the initiates made rock art images on the rocks, which were supervised by shamans (Williams 2002a: 171).

So far, these are only some of the ethnographic reports from South Africa as well as North America, which support our study.

A Neuropsychological Model

Before discussing ethnographic case studies from India, in search of a probable link between shamanism/trance/vision quests with image-making, we shall first discuss a three-stage model that has been propounded by noted archaeologist and rock art researcher, David Lewis Williams. Williams is a Professor Emeritus and Senior Mentor in the Rock Art Research Institute, University of Witwaterstrand, Johannesburg. He combined his lifetime anthropological research with recent neurological insights to the human mind. Following the track of evolution of the human mind, he argues that our ancestors possessed a more advanced neurological make-up, enabling them to experience shamanistic trances and vivid mental imagery. With such intense and vibrant neurological experiences these men felt it a necessity to paint these images on the cave walls. To them these walls served to be a membrane between their world and the supernatural, or, to be more specific, the spirit world (spirits of ancestors as well as evil spirits and demons), from which they believed they got the visions. His argument is based on a combination of study of San art in southern Africa and a neuropsychological model, which he referred to as the 'entoptic phenomenon'. To gain an insight into these concepts, we must first understand who a shaman is and what his role is.

A shaman is a sort of priest or medicine-man/woman who tries to manipulate circumstances by establishing contact with the spirit world. General belief among ancient societies was that Nature is alive with supernatural elements. Spirit of the ancestors hover around and they require careful propitiation. It was also believed that all of man's ills are derived ultimately from the spirit world. So malevolent spirits need to be subdued which can be done only by a shaman, who (he/she) possesses the unique quality of rising above normal human consciousness and can travel and operate among different 'planes' (in shamanistic term the word 'planes' refer to different worlds like present world and spirit world). He/she acts as an intermediary between the natural and invisible spiritual world, therefore acting as a guardian of a tribe's overall

health and welfare (Williams 2002a). As per the shamanistic beliefs, the rituals of birth, puberty, marriage, attaining a social rank (status) and death are believed to be moments of transition in any individual's life, when a person is in grave danger as he/she 'dies' in terms of his/her former self and has not yet been reborn into his new identity. At these moments of vulnerability, it is the shaman who accompanies the individual's soul across the uncertain gulf. Therefore, the shaman serves as a bridge between this world and the next, acting as a 'soul guide' to ease these life passages.

A shaman is capable of achieving the following goals. He/she can promote and increase order, health (heal the sick), wealth and happiness of individuals and also the entire tribe. He/she is capable to appease the ancestors and protect against evil influences (demons, illness, bad luck). He/she can control the movements and lives of animals and also change the weather.

Now we will discuss the three stages of neuropsychological model, established by Williams, through tests on individuals in laboratories in search of a link between images or signs seen during trance and rock art. This is aimed to see, what goes on in human mind when he/she hallucinates, goes into trance and finally into an altered state.

An interesting point to note here is that there are strong evidences that chimpanzees, baboons, monkeys, cats, dogs and other animals also hallucinate (Siegel and Jarvik 1975: 81-104). So, this suggests that hallucinations and altered states of consciousness are a function of the mammals in general and not only of the human nervous system.

In this case, during artificial laboratory tests, LSD drug were applied to individuals in order to induce a trance-like feeling in order to study the visions that occurred. These test results were then compared with rock art images. Reports on visual hallucinations provided very precise descriptions (Williams 2002a: 127). The research shows that in the 'Early Stages' an individual sees geometric forms,

such as grids, zigzags, dots, spirals and curves. This will probably help us to understand the presence of large number of geometric designs (intricate geometric patterns) or the pre-figurative art seen in rock art of India. The images seen during the laboratory tests are all shimmering, incandescent, mercurial and powerful. These forms of pulsating, iridescent geometric imagery (known as Phosphenes, form constants or entoptic phenomenon) are experienced principally in the first stage of altered consciousness which also persists in the later stages. Entoptic images – which mean 'within vision,' – are products of the basic neural architecture of the human brain. The recurring entoptic forms consist of basic grid and its development in a lattice and expanding hexagonal pattern, sets of parallel lines, dots and short flecks, zigzag lines crossing the field of vision, nested catenary curves and thin meandering lines. In 'Deeper Stage' of hallucination the individual tries to make sense of these images. The results may vary depending on the individual's own culture and present problem. For example a series of curves may be depicted as hills or the same curves as waves depending on what the subject is thinking. San shamans are seen to depict series of curves as honeycombs. Usually to the Sans, bees are considered to be messengers of gods therefore, the shamans try to harness its potency in order to enter the trance. In the 'Stage Three' hallucinations, the individual witnesses a feeling of a vortex or rotating tunnel around them and while in this state they start seeing iconic images which are derived from memory and are often associated with powerful emotional experiences (Siegel and Jarvik 1975:128), images also change one into the other (Grof 1975: 38-39; illustrates how an image of a clock tower can change into an owl). Nevertheless, even in this essentially iconic stage, entoptic phenomenon may persist and iconic imagery may be projected against a background of geometric forms or entoptic phenomenon may frame iconic imagery. A process of fragmentation and integration forms compound images: for example a man with zigzag legs. Finally in this stage subjects feel to be part of a strange realm. They blend with both their geometric and their iconic imagery (Kluver 1942: 181, 182). It is in this final stage that people sometimes feel themselves to be turning

into animals (Siegel and Juvik 1975:105) and undergoing other frightening or exalting transformations.

These neurologically-generated commonalities account, in large measure, for the striking and often surprising similarities of shamanism worldwide (Williams 2002b, 222). Therefore, some of the geometric motifs that have been found in rock art of India are probably representations of the entoptic forms.

Having established the three-stage entoptic model, Lewis Williams turned to the rock art made by the San communities in order to find similarities (as ethnographic evidences had already suggested that this art was shamanistic), and accordingly found all the entoptic signs present in their rock art. Images referable to all the three stages of the entoptic phenomenon were present. The same model was applicable to two other arts, which were known to be shamanistic. They were Tukano bark and house paintings (Reichel Dolmatoff 1978) and North American Coso rock art (Whitley 1998). What is most interesting is the fact that in case of art that is known not to be associated with altered states of consciousness like Rembrandt's work, this model of entoptic phenomenon does not fit in (Williams 2002b:198). The model can thus confirm or reject the hypothesis that the images of at least many arts are derived from the visions and experiences of altered states of consciousness (Williams 2002b).

Rock Art of India

Now, we shall turn to rock art of India and examine whether shamanism is still in practice amongst tribes and if that leads to any kind of image making.

Certain themes are common wherever shamanism is present and interestingly, these are also present in rock art of India. It looks as if many of the images in the rock shelters in India refer in some way or the other to the practice of shamanism. Rock art of India also contain many unexplained geometric signs, sometimes placed on animal bodies and at times done separately. The neurological

model of David Williams can help us to explain these intricate geometric signs. We must remember here that the entoptic visions are products of basic neural architecture of the human brain, therefore all people who enter certain altered state of consciousness, no matter wherever geographical location they belong to and from whatever cultural background, are going to sense them in the same way (Williams 2002a). Besides geometric figures, there are a range of depictions like the bees, monsters, demons, deified or composite animals (with a boar-like body and an elephant's trunk) fish, turtles, palm prints, group dances, elaborate head embellishments, individual dancers with raised hands and above all, clustering of a single rock face with number of images (all these various types of depictions are symbolic and associated with spiritual quest of the shamans), encourages one to believe that a large part of Indian rock art were probably symbols and metaphors reflecting a spirit realm. Moreover, there is evidence that sound and music plays an important role in shamanistic rituals as it helps in inducing a trance by providing hypnotic rhythm (Williams 2002b:266). Therefore, the number of musical instruments seen in Indian rock art confirms this understanding.

However, it needs mention here that apart from shamanistic rituals some more occasions in which rock art was made has been put forward by researchers. These are totemistic rituals (Layton 2000:179), hunting magic (Turpin 1992:295), fertility rituals and recording of astronomical events (Plog 1997:101). Rock art being a universal phenomenon, these theories are applicable even in the Indian context, for example the Upper Palaeolithic engraved core found at Chandravati, Rajasthan (Sonawane 1997:11-14) supports the symbolic representation of a mother goddess and fertility rituals. This can be concluded as evidences in the form of triangular-shaped natural sandstone with concentric laminations in the form of triangles found at Upper Palaeolithic site of Baghor-I, in Son Valley, Madhya Pradesh (Kenoyer *et al.* 1983). Local Koli and Bhaiga tribes worship similar colourful natural stones as symbol of Mother Goddess even today.

In India unfortunately, rock art is no more practised and the present tribal and folk groups do not associate themselves with such art in their areas except to explain it as the work of evil spirits or epic heroes (Chakravarty and Bednarik 1997: 31). The local belief of some villagers including Babulal, the senior-most person in Miapur village, in the vicinity of Bhimbetka rock shelters (Central India) is that witches and ghosts come in the night to make rock art (personal communication). Almost similar opinion is also expressed in Orissa (Eastern India) where the local people feel that these works are made by heavenly bodies or ghosts and they therefore consider it a taboo to even touch these works of art (Pradhan 2001: 27). However in order to address the issue of shamanism leading to the creation of rock art, recorded shamanism within India must be considered. Most of the present-day tribal communities have shamans who take care of the tribe by warding off evil spirits.

Ethnographic Examples from India

In India, the most important reference comes from the Saura tribes of Orissa. Saura art is directly linked with shamanism. Sauras make their paintings in their houses and not on caverns of rock shelters and boulders. The following information has been obtained from data reported by Sadashib Pradhan by interviewing elders of the Saura community, conversant with the community traditions as well as different aspects of art and religion, and the artists themselves (Pradhan 2001).

Sauras are known for their paintings and engravings. For the Saura community, 'Art' performs an important function in their life. It is not done during leisure time. Comparative study done by researchers reveals that the basic character of the Saura art has remained unchanged, like the associated beliefs, myths and rituals. To be more specific, since the last 50 years (beginning with Elwin) except little changes that have taken place as a result of acculturation, education or use of synthetic colours from local markets, the basic socio-religious character behind the purpose of the art has remained unchanged.

What we come to know from these interactions is that, first of all the Saura art (especially that of the hill Sauras) is inspired and directed mainly by religion and secondly, the making process of the paintings is elaborate. Sauras draw icons for anything related to their general well-being and success. They believe that they live in association with the supernatural entities, so they turn to them whenever they face any difficulty in their struggle for existence. Whenever they are faced with unnatural tragedy like an earthquake, epidemic, or even attacks by ferocious animals as well as diseases, the Sauras attribute its cause to the Gods and spirits. They feel that as a remedial measure the supernatural beings need to be pleased and pacified, and this they do by drawing. The Sauras usually carry out the process of image making in three stages.

In stage one, when a member of a family falls ill or in any unusual situation the village shaman (*kuranmaran*) is called to identify the cause of the suffering. Usually the shaman is able to identify the spirit or the power that has caused the problem, by a process in which he rubs white rice (*aru* or unboiled rice) on a winnowing fan and utters incantations till the spirit is identified. It is now the duty of the head of the household to make the arrangements to pacify the spirit, in whose honour the icon has to be drawn.

In stage two, the picture man (*ittalmaran*) is called, before which all necessary arrangements are made for him to draw the picture. The day before drawing, the house wall is given a red wash with locally available haematite clay mixed with water by the housewife. In certain cases, if the shaman has not been able to identify the spirit whose picture has to be drawn then the picture man sleeps beside the designated wall in order to get a dream and identify the spirit. On the day of the painting, all the members of the family including the picture man take their bath. Rice, fruits, vermilion, lamp, ghee, incense sticks and a pot of wine are placed next to the walls designated for the ritual drawing. The picture man seeks blessing of important gods and spirits and offers some wine on the earth as well as on the wall. He himself drinks some wine and asks for mercy in case any mistake is committed (Elwin: 1951). He then

concentrates and makes the picture with white paste (rice paste mixed with water) and brush made out of bamboo split or palm twigs. He visualizes the entire composition in accordance with the occasion and his mental imagery finds expression on the walls of the house. Usually in Saura art, a house for the supernatural entity is drawn first, represented with a square or rectangle (in some cases if the shaman knows how to draw then he too paints).

In stage three, the shaman is called, who invites the spirits by going in a trance. The spirits then expresses the cause of its anger through the mouth of the shaman. In this case, criticisms uttered by the spirit are like: he wanted a comb or a bicycle, things that were dear to him. The picture man immediately compensates these deficiencies by drawing it on the wall thereby making the composition overcrowded. After the picture is completed the shaman performs the elaborate ritual of consecrating the idol. Animals are sacrificed and the blood of sacrificed animals is smeared on the painting along with plenty of other offerings. The shaman concludes by hanging a new earthen pot from the roof against the picture.

For another example to support our study we turn to tribal art of the Himalayas, which is characterized primarily by its links with shamanism (Charot 1988) though, here too, the canvass is not rock-shelters and boulders. Figurative art developed in the western region of the Himalayas, where figures were advised to be made by the shaman, with an intention to act as a guard to the family and the house, the community and its territory against evil or hostile spirits. These beautiful statues mostly carved from wood are sober and stylised. Figural carvings are also seen on bridges, mountain passes, crossroads, at the confluence of two rivers and on water springs. This is done because in the mountainous land, Gods and spirits are perceived to be everywhere. Strange wooden models depicting sexually explicit male and female figures are seen which probably have something to do with the magical sexual practices that exist amongst the shamans. However, owing to strict secrecy preserved by the shamans who actually know about these strange wooden models, we do

not get to know the real interpretation for the existence of these figures.

Khovar and Sohrai art (obtained from internet site named Tribal Religions of India) belonging to tribes from densely forested parts of south Bihar plateau is a pair of essentially matriarchal art forms linked with the seasonal cycles and implicit with the feminine symbols, sexuality, and fertility. These artistic ritual traditions are carried through generations and made by married women, called 'Devis' during the marriage and harvesting seasons. 'Devis' pass on their knowledge of sacred icons to their daughters, who take these forms with them when they get married and go to their husband's homes. (Understanding the evolution and dissemination of these sacred art forms is only possible for a senior 'Devi' of the tribe, therefore there lies scope of further research in this direction). Interestingly, there are rock art sites in the jungles of Hazaribag.

A further look at contemporary tribal communities within India can help us to appreciate the fact that many tribal arts do have spiritual and shamanistic links. The Rathwa Bhils of Madhya Pradesh and eastern Gujarat commonly install a deity in the form of a ritual wall painting within the home. They make terracotta model horses, which are used as spirit riders and placed at small shrines on hills and under trees. The Bhils and Bhilala tribes of Madhya Pradesh paint myths related to 'creation'; these paintings are called 'Pithora paintings'. Horses, elephants, tigers, birds, gods, men and objects of daily life are painted in multicoloured hues. Auspicious wall paintings called 'Mandanias' meant to welcome gods into houses are made in Rajasthan and Madhya Pradesh.

Another form of tribal art is called 'Madhubani.' It is traditionally painted on walls and floors by the women of Bihar. This is done to invoke divine protection. Scenes from Hindu epics, fertility symbols, auspicious birds and beasts are daubed on walls with the paste of newly harvested rice. One more form of tribal painting from Maharashtra is called 'Warli' paintings. They are made with white paint (originally with rice paste) on mud walls;

usually depict sowing and harvesting scenes.

Interestingly trance and 'being possessed' are a common phenomenon amongst the tribal communities in India. Shamans are also present and are called by different names by each tribe.

Conclusion

From the aforesaid data we can conclude that shamanism is part of many ancient rituals all over the world. Various art forms owe their origin to this traditional practice. Shamans have used art to create an atmosphere that helped them to induce shamanistic trances and trigger off their senses. In this connection, we must remember

that any form of art has the capacity to create illusion and to display the unseen/unknown before our eyes. These miraculous, magical qualities have led all spiritual traditions to employ the magic of the arts in one way or another.

Hence, it appears that some of the rock paintings and engravings are probably reflections of images belonging to a spirit realm. Most of them are symbolic representations, and made as part of rituals. They should not be simply viewed as events depicting daily lives of the people. Along with descriptive details (this does not include geometric patterns and highly abstract paintings) rock art also renders a spiritual reality before us.

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The Harappan Spoked Wheels Rattled Down the Streets of Bhirrana, Dist. Fatehabad, Haryana.

L.S. RAO*

Wheel is one of the oldest and most important inventions which greatly revolutionized the human lifestyle generating faster pace in the overall development of human life from the stage of nomadic to that of sedentary and advanced stage of prosperity. This is nowhere better illustrated than during the Mature Harappan period in India.

From the days of Mahenjodaro (Marshal 1931:554) and Chanhu-daro (Mackay 1943:162-63) excavations, it was opined that during the Harappan period there existed only solid wheels constructed out of three solid pieces of wooden planks. These opinions were premised on "definite evidence in a painted model wheel" and a comparative study of the model terracotta toy wheels of Harappans with those coming from the contemporary Sumerian civilization. Coupled with these, the solid copper wheel models found along with the copper toy-cart at Chanhu-daro gave the notion that use of solid wheels "as a characteristic feature of the Indus civilization" (Wheeler 1962:74). Subsequently, this kind of assertiveness in respect of solid wheels became one among the important factors in intensifying divisive research approaches in understanding the Harappan Civilization vis-à-vis the Vedic Aryans. While discussing the issue of non-

equivalence between the Harappan civilization and the advent of Aryans in India it has been emphasised that no spoked wheels existed during the Harappan period. Rather spoked wheels were supposed to have been introduced in India by the chariot riding Aryans (Sharma 2006:18-20). In this regard, a couple of already published evidences in favour of spoked terracotta toy wheels from Harappan sites like, "... a sherd depicting a canopied cart with spoked wheels" from Banawali (Bisht 1993:116), and a fragmentary terracotta toy wheel with painted spokes (Bhan 1975:69) have been rejected. In case of the former it has been convincingly argued, "But the painted shard produced by him shows seventeen parallel lines which appear to be decorative. These lines can not be considered spokes, for neither they converge at a hub/central point nor do the distances between them tend to narrow down towards any end". But in respect of the latter, arguments are mixed with a flair of hypothesis, "the strokes shown on Plate XXI of his publication could be decorative design which do not appear on a wheel. Even if the disc is taken as a wheel, the strokes may indicate the joining of the wooden planks used in making it" (Sharma *op cit.*). On the other hand arguments in favour of prevalence of real spoked wheels during the Harappan period as represented by terracotta toy wheels

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have been further buttressed by putting forth fresh evidences coming from Kalibangan, Rakhigarhi and Banawali (Lal 2002:72-73 & Bisht 1987:150). These evidences though limited, have made it clear about the existence of spoked wheels during the Harappan period. Unfortunately, only a hand full of such spoked toy wheels has been published.

Against this background, it is of immense significance that the excavation of Harappan mound at Bhurrana (Lat. 29° 33' N., Long. 75° 33'E.) has yielded considerable number of spoked terracotta toy wheels from the Early Mature Harappan period (i.e., transition from Early to Mature Harappan period) onwards.

Terracotta toy wheels make their first appearance during the Early Harappan period at Bhurrana. Most of them belong to solid and non-painted category. From the present collection of this period there is nothing to suggest, either through painting or any other means, about the prevalence of spoked wheels. But, the succeeding Early Mature Harappan period has to its credit a couple of both painted and non-painted terracotta toy wheel with spokes (Fig. 1.1 & Pl. I.1 and Fig. 3.1 & Pl. IV.1 respectively) along with plain solid wheels. Interestingly, during the following Mature Harappan period we see a considerable proliferation in the number of terracotta toy wheels with spokes.

A cursory glance of terracotta toy wheels of Bhurrana reveals that the wheels of the Early Harappan and Early Mature Harappan period are crude in making and smaller in size. On the contrary, sophistication and variation in sizes are the hallmarks of the terracotta toy wheels of Mature Harappan period.

General Characteristic Features of Terracotta Toy Wheels.

The terracotta toy wheels from Bhurrana are made of potter's clay which invariably contains mica of different proportion. Some of these wheels are coated with a thick

slip and are well - fired. Majority of them are partly handmade and partly on mould as a result of which the inner face remains flat for the simple reason that the wet clay was placed on a flat based mould. There are also a few exceptions with concave inner face. But in one case the wet clay of wheel was pressed against a mat resulting in its impression on the inner face (Pl. III.15). Further, squeezing of the upper wet surface of the wheel with the help of finger one can produce a hub which in majority of cases at Bhurrana, is irregular in shape. The hubbed surface is taken for outer face of the wheel as double-hubbed wheels are not reported from the Harappan context so far. There are also a few wheels with exceptionally well-shaped hubs, perhaps made by an expert hand. Hub, in general, is either a prominent or protruding one with semi-convex, or a dwarf but a tapering hub with well defined convex outer face. The overall look of wheels shows a plano-convex or concavo-convex cross-section with a hub, only on outer face, and a satisfactorily defined outer rim. But, as an exception, on a non-painted terracotta wheel, perhaps an attempt has been made to show the presence of an incipient hub on the inner face by providing additional lump of clay (Pl. III.16). A pre-firing axle-hole piercing across the thickness of hub occurs mostly acentric. Interestingly, a few of both painted and plain terracotta toy wheels betray pre-firing lynchpin crossed-groove marks over the outer face of hub.

In addition to the single-hubbed wheels there is also a class of hub-less terracotta toy wheels with both the sides having flat surface, a bold pre-firing axle-hole in the centre and a clearly defined width of outer rim. These wheels are plain and do not bear paintings. But in case of a solitary example of the hub-less wheel both the faces are decorated with nail-incisions (Pl. III.14).

Further, on the basis of a detailed analytical study of the terracotta toy wheels of Bhurrana, these objects can broadly be divided into two categories: i) Painted terracotta toy wheels and ii) Non-painted / Plain terracotta toy wheels.

The above categorised wheels can further be subdivided into four as follows:

- Ia. Terracotta toy wheels with painted spokes.
- Ib. Painted models of solid terracotta toy wheels.
- IIa. Terracotta toy wheels with spokes in low relief.
- IIb. Non-painted / plain models of solid terracotta toy wheels.

I (a). Terracotta toy wheels with painted spokes
(Fig. 1.1-14; Pl. I.1-14 & Pl. III.1-10)

The Harappan craftsmen were well-known for their skill and ingeniousness. The Harappan paintings on various objects of day to-day use were no exception to this. Successfully, through paintings they have been able to convey the intended ideas in their art creations. Thus their art also showed the existence of real spoked wheels in the contemporary society. In this class of painted wheels the bands painted in black/chocolate stand for the spokes which emanate from the central hub and radiate like rays towards the outer rim of wheel. But, as an exception a broken wheel betrays partially preserved plus mark on its outer face (Fig. 1.14; Pl. I.14). Terracotta toy wheels with similar plus marks have been reported from Lothal and identified as spoked ones (Rao 1985:511; Pl. CCXXII B, 1&3). Not contented with painted spokes only on the outer face, to make it doubly sure, craftsmen replicated painted spokes on the inner face too (Fig. 1.1-3, 5, 8-13; Pl. III.1-10). Similarly, a couple of wheels bear plus mark on their inner face also (Fig. 1.2, 13). Apart from fragments, fortunately, we have three intact terracotta toy wheels depicting painted spokes on both sides (Fig. 1-1, 3, 12; Pl. I.1, 3, 12 & Pl. III.1, 3, 9).

Although there exists an interesting fragment of terracotta toy wheel with spokes on both sides, yet the positioning of painted spokes emanating from the hub calls for a detailed explanation (Fig. 1.8; Pl. I.8 & Pl. III.5). Herein lies a double row technology of spokes drawn around the hub. A series of spokes radiating in slanting

position were drawn first, over which another row of radiating vertical spokes were superimposed. This superimposition of spokes has lent mesh-like look, but in reality, they are not interwoven. Similar arrangement of spokes is also painted on the inner face, though in a highly exaggerated manner. Strangely this kind of double row spokes arrangement is nearly similar to that of the spokes of modern bicycle wheel!

I (b). Painted models of solid terracotta toy wheels
(Fig. 2.1-10; Pl. I.1-10 & Pl. III.12, 13)

Paintings on pottery and other antiquities, besides being decorative also stood for symbolism and thus suggestive in nature. Those concepts, which are simple and quickly grasped like spokes in a wheel, could be implied through radiating hands. But, in contrast to this, we need special motifs to distinguish solid wheel from spoked wheel in their painted model forms. Interestingly the first confirmation of the use of solid wheels during the Harappan period came from a painted model wheel from Chanhu-daro (Mackay, *ibid.*) Here, a broad band of paint in the middle of terracotta model wheel is drawn in such a way that the painted bands on both sides coincide. But craftsmen of Bhirrana, it appears that instead of simple motif, has chosen to be more artistic and elaborate in implying the solid nature of wooden planks used for construction of wheel. At least three ways of means could be noticed here.

1. In this category, a common schematic painting is drawn on either side of wheel intentionally to indicate coincidence of similar look of solid surface. Keeping hub in the centre, both outer and inner faces of wheel are divided into four equal quadrants by drawing a bold plus mark. Further, each quadrant is occupied by a semicircular arch whence vertical/slightly oblique multiple strokes run towards the peripheral end of wheel (Fig. 2.1, 8; Pl. II.1-8 & Pl. III.12, 13).

2. In this category too, keeping hub in the centre multiple parallel lined two sets of horizontal and vertical bands are drawn in such a way so as to form a square. In



Fig. 1: Teracotta toy wheels with painted spokes (1 Early Mature Harappan period, 2-14 Mature Harappan Period), Bhurrana. (c) ASI

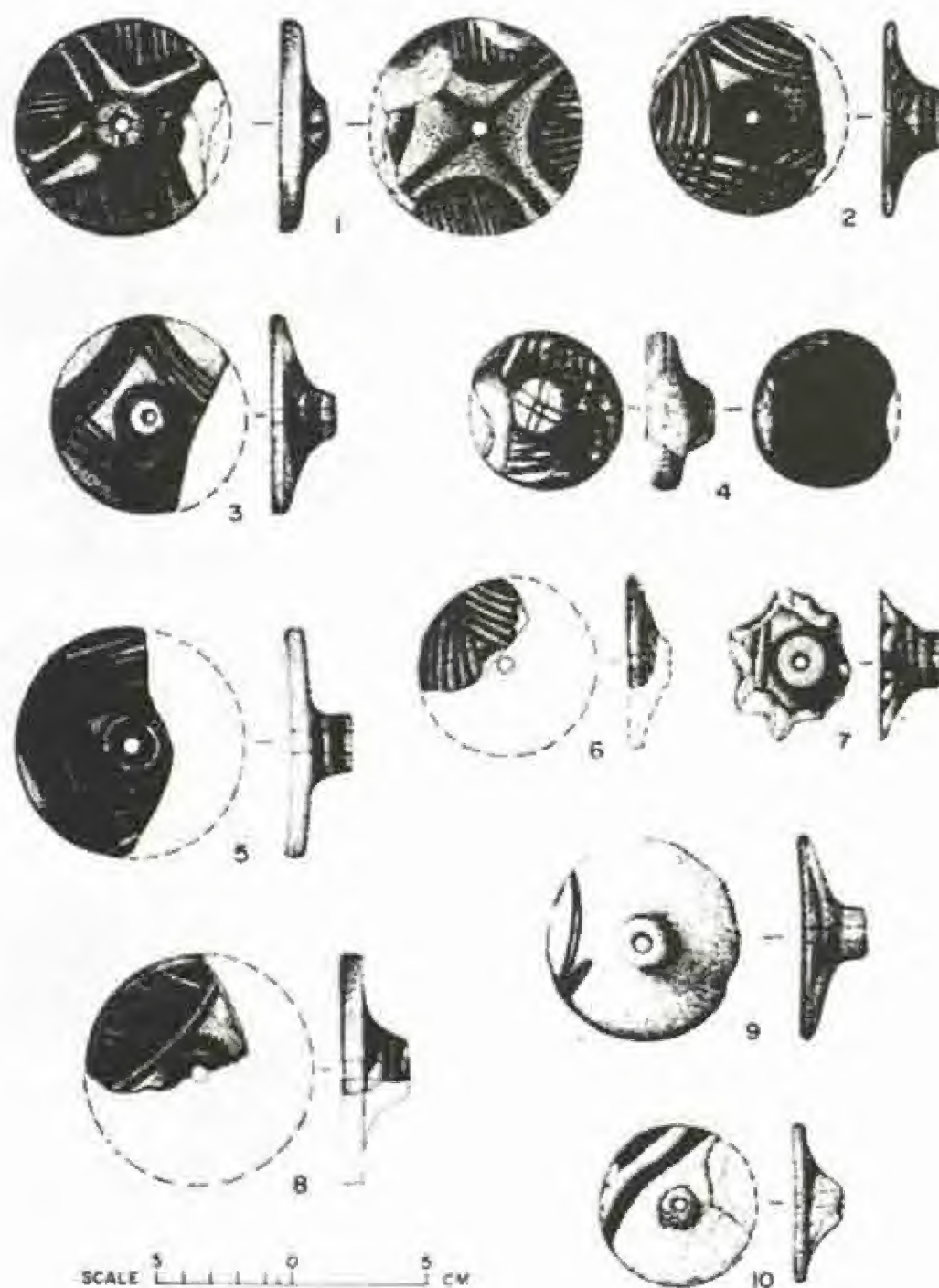


Fig. 2: Painted models of solid terracotta toy wheels of Mature Harappan period, Bhirrana. (c) ASI

certain cases this design looks like a trapezium or triangle (Fig. 2.2-7; Pl. II.2-7). Hub is invariably covered with circular painted bands. Similar painted terracotta toy wheels are also reported from Mitathai (Bhan 1975:68; Pl. XXI, 2), Banawali (Bisht 1987:150) and Harappa (Vats 1940:45; Wheeler 1947:129, Pl. I, B, 3).

3. Besides, there are a few examples of terracotta toy wheels having painted multiple, parallel, horizontal bands running across the outer face (Fig. 2.9-10; Pl. II.9-10). The painted wheel specimen of canopied chariot from Banawali referred to elsewhere belongs to this class.

These multiple parallel lined sets of painted motifs on their horizontal and vertical planes may represent three solid wooden planks used in the construction of wheel. Or, as postulated by Mackay, in order to hold all three pieces together and strengthen the wheel, "Doubtless tenons were used, but alone these would not have sufficed to hold the wheel together, and lashings or battens of some kind must also have been employed" (Mackay 1943:162). Thus, these multiple parallel lines may stand for lashings or battens. Here too craftsmen of Bhirrana were realistic in their approach as we have terracotta wheel examples bearing replication of such lashings or batten motifs on the other face of the wheel (Fig. 2.4; Pl. III.13).

II (a). Terracotta toy wheels with spokes in low relief (Fig. 3.1-20; Pl. IV.1-20)

In addition to terracotta toy wheels with painted spokes, there is one more class of spoked toy wheels where spokes were represented in relief. Here lies the ingenious skill of Harappan craftsmen. The technique involved herein is as simple as pressing of finger in a radial fashion around the hub when clay was wet. This leaves behind a corrugated surface on the outer face. The raised ridges of such corrugations resemble spokes. Two such examples have already been published from Banawali (Lal 2002:72-73; Fig. 3.30). Incidentally, it may be observed that the outer face of a terracotta toy wheel, which forms part of a mounted terracotta ram from Chanhudaro, betrays distinctly similar

features of simulated spokes in relief (Kenoyer 1998:228, Cat. No. 161). However, such features on terracotta toy wheels have gone unrecognised. Fortunately, now, Bhirrana has yielded considerable number of terracotta toy wheels with spokes in relief.

II (b). Non-painted/plain models of terracotta toy wheels

This category of terracotta toy wheels are large in numbers and bear all those features, minus paintings, described above under the general characteristic features. Therefore, they have been treated, here, as non-painted models of solid wheels in general, as such are not illustrated separately. However a few of them have lynchpin groove marks on the hub.

Apart from the above classifications of terracotta toy wheels there exists a solitary example, which makes a class of its own. In this example, motifs as represented on the above described models I (a) and II (a) are combined together to emulate spokes in relief on outer face and painted spokes, on inner face (Fig. 3.21; Pl. IV.21 & Pl. III.11).

Significance of Lynchpin Grooves

The presence of lynchpin groove marks on the outer face of hub of terracotta toy wheel from Bhirrana is an important feature to be taken cognisance of while understanding functional relationship between axle and wheels during the Harappan period. In this context it is pertinent to note the observations of some scholars. To quote, "wheels of the Sumerian vehicles were built up from more than one piece of wood, and very much the same form of construction must be imagined for the wheels of the vehicle used by the Indus Valley Civilisation, especially as the wheels of the modern Sindhi cart closely resemble those of Sumer, and like them were fixed to an axle that revolved with them" (Marshall 1931:554). The same opinion is still being held by other scholars too (Kenoyer 1998:89). Differing a little from the aforesaid opinion,

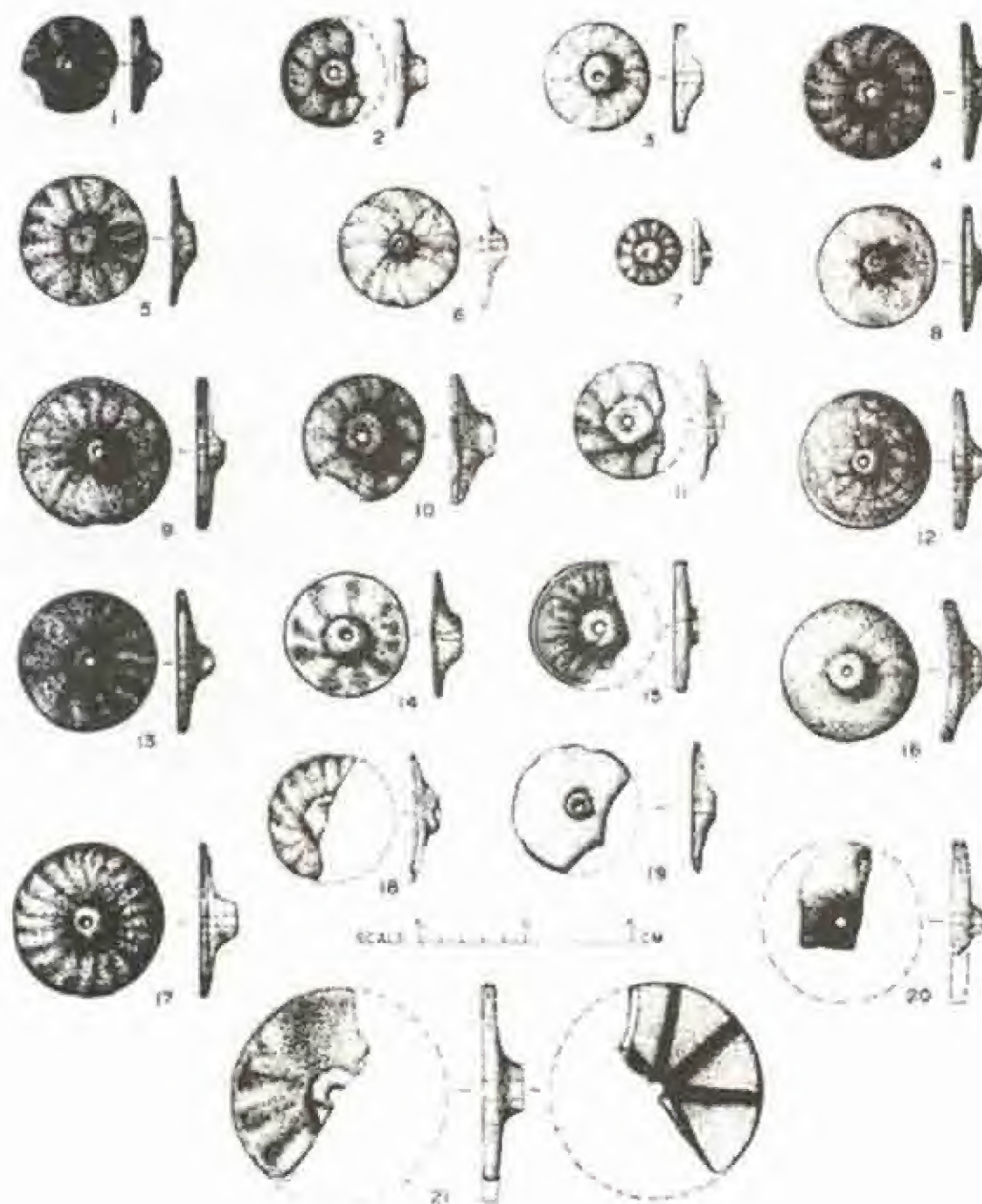


Fig. 3: Terracotta toy wheels with spokes in low relief (I Early Mature Harappan period), Bhirrana. (c) ASI

Mackay contended that the model wheels of Mohenjo-daro closely resemble those wheels that are being used in the modern Sindhi cart wherein one wheel is fixed to axle and the other revolves. Further he says, "...these wheels ... show sign of wear in the axle-hole which suggests that some of them at least revolved on their axles." (Mackay 1938:568). In view of this it is of great significance to note that for the first time terracotta toy wheels of both solid and spoked varieties from Bhirrana bear lynchpin marks in the form of crossed-grooves on the outer face of the hub. Lynchpins are provided on the extreme ends of axle rod so that wheels will not fall off while revolving around the axle. This fully establishes the fact that the wheels were definitely revolving around the axle and not fixed to the axle as surmised on the basis of modern Sindhi carts. (Fig. 1.3, 4, 6, 8, 12; Fig. 2.1.4; Pl. I.3, 4, 6, 8, 12 & Pl. II. 1.4).

Conclusion

From the foregoing account it is discernible that in the initial stages of research of Harappan Civilisation, especially with regard to terracotta toy wheels, the opinions were based on a fair amount of imagination and the then available paradigms coming from ancient Mesopotamian and the modern Sindhi parallels. In course of time such opinions went on to assume dogmatic dimensions as reflected in the study of Harappan Civilisation vis-à-vis Vedic Aryans. It has been strongly believed by a section of scholars that Harappans did not use spoked wheels at all. But research knows no static posture. It keeps gradually altering the position of opinions and theories. This could be seen in trickling evidences of painted as well as relief spoked terracotta toy wheel models coming from various sites like Kalibangan, Banawali, Mitathal, Rakhigarhi and Lothal. Although these spoked terracotta wheels in number are very few and far between, yet the significant point to be noted is that they all belong to the Mature Harappan period. To crown upon all these, the considerable number of both painted and relief spoked terracotta toy wheels from Bhirrana has firmly dispelled all the misconception about the existence of spoked wheels during the Harappan period.

To recapitulate, it is also of great significance that the early Harappan period has witnessed the introduction of plain terracotta toy wheels of solid variety at Bhirrana. But gradual technological advancement within the Harappan society gave rise to the production of spoked wheels during the Early Mature Harappan period. And finally the Mature Harappan period witnessed a fully bloomed spoke-technology as illustrated in the spoked terracotta toy wheel models recovered from Bhirrana. It is also pertinent to remember that Bhirrana mound does not have Late/Post-Harappan cultural deposit.

However, in finess of the situation, it may be observed that besides Lothal in Gujarat, majority of the sites like, Kalibangan, Banawali, Bhirrana, Rakhigarhi, and Mitathal, which have yielded spoked terracotta toy wheel models so far, fall within the Saraswati-Ghaggar-Hakra and Drishadvati basin. But, in contrast, such spoked wheels have not been reported from the Indus Valley so far. Then, what could have been the reasons for their absence in the Indus Valley? It needs a thorough probing. In the present state of knowledge, reality is that spoked wheels were not only rattle down the streets of Bhirrana but also widely used in the Saraswati-Ghaggar-Hakra and Drishadvati valley during the Mature Harappan period.

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Further Excavations at Lahuradewa, District Sant Kabir Nagar (U.P.) 2005-06: Preliminary Observations

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Introduction

Those days have gone when the history of Sarayupar area in the Middle Ganga Plain before the Buddha was considered anybody's guess and known only by the process of urbanisation for the second time during the first millennium BC, about a thousand years later than the abortive Harappan Civilization in the north-western Indian region. The outcome of Sohgauna excavations in Gorakhpur District during 1961-62 and 1974-75 (IAR 1961-62:56; 1974-75:46-47; Chanrvedi 1985) vacillated this long-prevailing view for the first time. A considerably thick pre-NBPW occupational deposit could be unearthed here. The lower-most deposits containing mostly handmade coarse variety of red ware bearing cord impressions on their exterior surface were associated with the Neolithic phase. The deposits overlying this phase were placed under Chalcolithic. The diagnostic ceramics of this phase were marked as plain and painted black slipped and black-and-red wares. The radiocarbon dates available for the later Chalcolithic III were determined as Cal. 1410 \pm 130 BC (PRL 179) and Cal. 1490 \pm 110 BC (PRL 178) (Possehl and Rissman 1992). The lower level of Chalcolithic II was assessed to be around 1900 BC and

the beginning of the preceding Neolithic period at Sohgauna during the first half of the third millennium BC (Chanrvedi 1985: 107). Since Sohgauna remained the only site dated to such an early time, most of the archaeologists and historians remained reluctant to give due importance to these finds. Even the surface finds from Gulrihwa Ghat and Banwaru Ghat located on Manorama River in western part of Basti District, comparable with Chalcolithic assemblage of Chirand, could also not draw the due attention.

During the subsequent time, consistent excavations carried out at the ancient sites of Khairadih, District Ballia (Singh 1985-86), Narhan (Singh 1994), Dhuriapar (Singh 1992) and Imlidih Khurd (Singh 1993, 1994), all three in District Gorakhpur, and Waina (Singh 1996) and Bhuna Dih in District Ballia (Singh 1998), and also simultaneous explorations in Sarayupar and other parts of the Middle Ganga Plain securely established the existence of Chalcolithic settlements in a considerable number. At Narhan and some other sites, this phase, represented by painted black-and-red and black slipped wares, and placed it between c. 1300-800 BC, is termed as Narhan Culture (Singh 1994). Because of these works, the earlier

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excavations carried out at Khairadih, District Ballia (Singh 1989) also came into focus. These works also indicated towards the presence of an earlier phase of human activity in the region.

An appraisal of the results of the above investigations showed that the chronology of the lowermost deposits of Sohgauna and Imlidih Khurd in particular, and Chalcolithic phases in general still needs a sound footing on the basis of radiocarbon dates. Since Sohgauna is a huge mound and most of the area revealing early settlement Deposits at Imlidih Khurd is ruinously disturbed, we attempted to excavate the nearby site of Lahuradewa in district Sant Kabir Nagar (Fig.1), with a hope to settle the confusion in chronological sequences of cultures. Coincidentally, it brought positive results. Lahuradewa was reported by S.N. Chaturvedi of the University of Gorakhpur (Chaturvedi 1980, 1985) and its archaeological potential was well assessed by a number of experts. During the initial

investigations a (Tewari *et al* 1996) large area of this site was found undisturbed and in a good state of preservation. The surface deposits yielded NBPW and other cultural material datable to early centuries AD, indicating that the removal of these later deposits would not take much time to reach the deposits of early cultures lying beneath.

On behalf of the U.P. State Archaeology Department, the excavations were initiated at this lakeside ancient mound of Lahuradewa during 2001-2002. The objectives of the first season's work were to ascertain: (1) the perspectives of the commencement of early farming; (2) the antiquity of rice growing cultures in the region; (3) interactions between these early farming cultures with the contemporary cultures of other areas; (4) the cultural context and the time of introduction of wheat and barley in Sarayupar region, two well known crops of western part of Indian subcontinent; and finally (5) to understand the habitation plans of early settlers at the site.

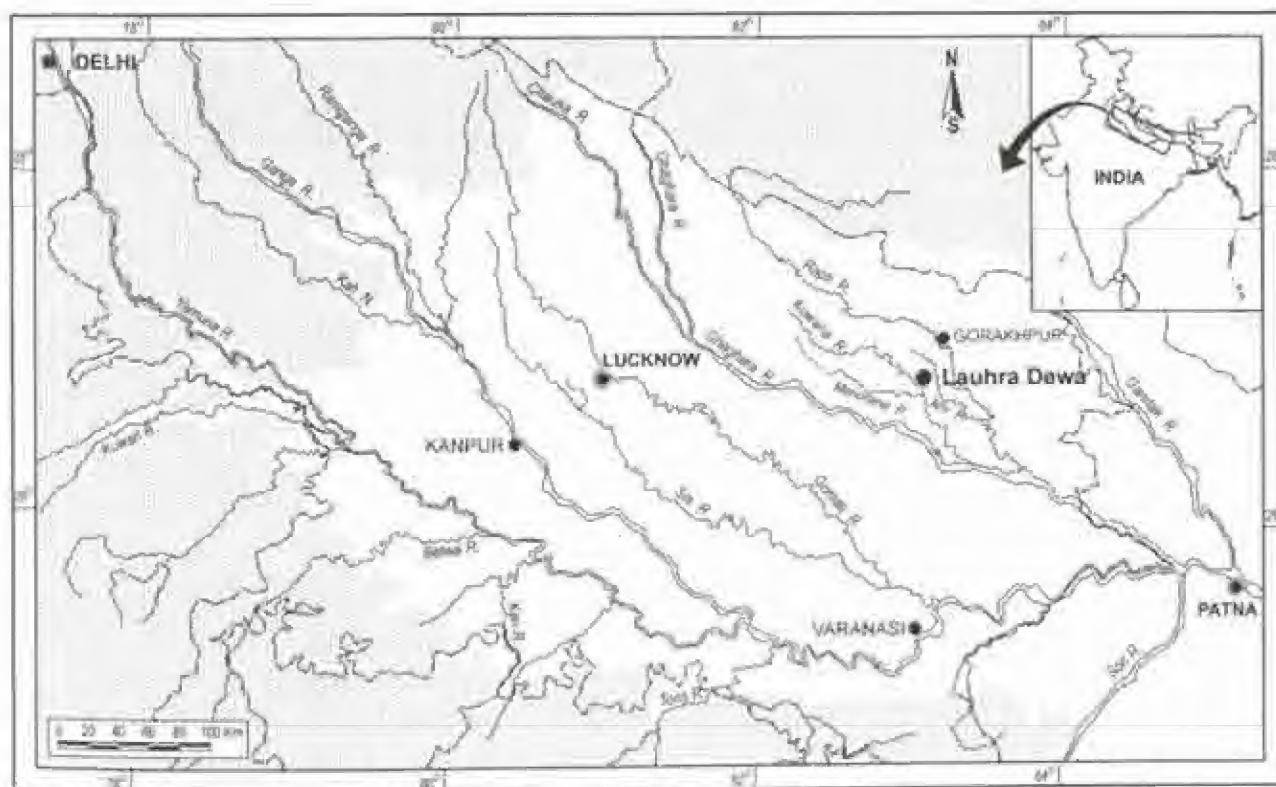


Fig. 1. Map showing the location of Lahuradewa

About 3.00 m thick occupational deposit revealed during the first season's excavation work was divided in the following five-fold cultural sequence:

- Period I Early Farming Phase
- Period II Developed Farming Phase
- Period III Advance Farming /Early Iron Age
- Period IV NBPW Phase
- Period V Early Historic (Early centuries BC/AD)

The preliminary reports on the first season's work have been published in *Purātattva* (Tewari *et al.* 2002) and elsewhere (Tewari *et al.* 2003). The results of this work solved some of our objectives and also posed new problems as well, for future considerations. Keeping these objectives and problems in mind, this site has been subjected to further excavations during the subsequent seasons in 2002-03, 2003-04 and 2005-06. Apart from excavations at the archaeological site, our collaborators from the Birbal Sahni Institute of Palaeobotany, Lucknow and Department of Geology, University of Lucknow also undertook the studies on Lahuradewa lake sediments to work out the past environmental background of the area. This paper will underline the important finds brought to light during the course of excavations undertaken in 2005-06.

Excavations in 2005-06

The excavation team under the leadership of the first two authors included K.K. Singh, G.C. Singh, Narsingh Tyagi, Gyanendra Rastogi, Balram Krishna, Ram Gopal Misra and Manmohan Dinri. During this season's work, five trenches measuring 10 x 10 m were laid down in three locations in the central and western parts of the mound. The excavations were carried out in qdts. I & III of trench YA4, qdt. I of trench ZB2, qdt. I of trench ZA2, qdts. I & II of trench C2, qdt. I of trench D2, qdt. IV of trench ZA4, qdt. IV of trench YG4. The unexposed portions of the previously excavated qdts. I & II of trench YA2 were also subjected to further excavation. This season's work further

corroborated the five-fold cultural sequence identified at Lahuradewa during the previous work.

Period I is divided into sub-periods IA and IB. About 68 cm thick cultural deposit of sub-period IA, comprising layers (14) and (13) yielded only coarse variety of red and black-and-red wares. Their number considerably decreases below the upper levels of layer (13), restricted to only a few sherds in each dig. Most of them are handmade and bear cord impressions on their exterior. The outer surface of some of the potsherds is treated with red slip. The shapes include only vessels and bowls.

The appearance of a painted pottery in sub-period IA is worthwhile. In earlier excavations at this site such examples were restricted to the upper levels of sub-period IB. This time, their occurrence is recorded in the deposit of sub-period IA in the layer (13). Their stratigraphic context is carefully ascertained. These specimens are the broken parts of a vessel of a coarse variety of black-and-red ware (Pl.1). Upper shoulder of these potsherds comprises a fine red slip on their exterior surface, which is further decorated with post-firing incised parallel linear pattern and subsequently with painted small vertical lines in creamish white colour. Below the shoulder they bear oblique cord impressions.

It is also to be noted that during the earlier excavations a few grey ware sherds were reported from the deposits of sub-period IA. However, this season's more controlled excavation and closer observation has ascertained that such sherds are absent in layer (13) and (14) in sub-period IB. It seems that the earlier reported potsherds from these layers were most probably found in their context due to intrusion from upper layers.

A channel associated with sub-period IA was exposed during the previous excavations. A portion of this channel in trench YA2 has been vertically excavated during this season to understand the course of its construction and stratigraphic position. This season's work showed that the settlers of this site, associated with layer (14), dug the drain

through natural soil. Originally the drain was only about 30-50 cm broad at upper level and about 50-60 cm deep. Subsequently, it became broader due to siltation and overflow of water in it. Finally, the drain got filled up and became defunct towards the upper level of layer (13). The postholes found on the surface of the sealing level of the drain clearly show that when the surface became flat, a wattle-and-daub structure was constructed over it. It is also notable that the area where this drain was cut was naturally a little depressed, as shown by the layers of silt embedded in the deposits below the layer (14). The cuttings along the sides of the drain traverse through these depositions. The gradient of the channel is from north to south-from lakeside towards the central part of the mound.

The carbonised remains of domesticated rice during the course of initial excavations in 2001-2002 were limited in quantity. During the course of subsequent excavations, the finding of grains in sufficient number (Pl.2) has corroborated the evidence of domesticated rice right from the onset of occupation at the site. According to Saraswat, these grains represent both domesticated and wild varieties, which further corroborates the beginning of rice-based agriculture at the site at least around middle of the seventh

millennium BC. Apart from that the presence of foxtail grass along with rice is also attested. Detailed study of the other botanical remains is underway.

Structural remains of sub-period IA are represented by postholes and small burnt clay lumps, - bearing grass and reed like impressions. Other associated finds include beads made of steatite (Pl.3), carnelian, and semiprecious stones, stone chip, grains and seeds in association of charcoal-pieces, charred and un-charred fragmentary bones. The presence of wafer-thin micro disc beads of steatite is important. Elongated tubular and circular types of beads are also represented. A finely made broken bone point is another remarkable find of this sub-period.

On the basis of available conventional and AMS radiocarbon dates sub-period IA may be placed between middle of the 7th millennium and end of the 4th millennium BC.

About 50 cm thick cultural deposit of sub-period IB comprise layer (11) and (12). It is notable that during the earlier excavations layer (11) was associated with Period II. However, during the excavations of 2005-06, it has been

The dates available so far for sub-periods IA and IB

Cultural Period	Material dated	Cal C ¹⁴ dates in BC
Period IB	Charcoal	BS-1950: 2135, 2078, 2056;
	Charcoal	BS-2274: 2919 (2700) 2576;
	Charred barley grain (Pl. 7)	IRL-6903 (AMS): 2345-2200;
Period IA	Charcoal	BS-2145: 3090 (2916) 2879;
	Charcoal	BS-2148: 3363 (3328, 3221, 3174, 3159, 3119, 3106, 3105) 3020;
	Charcoal	BS-2151: 3654 (3635, 3553, 3542) 3382;
	Charcoal	BS-1951: 4220, 4106, 4161;
	Charcoal	BS-1967: 5298;
	Charred rice husk	IRL-6442 (AMS): 6442 - 6376;

observed that this layer has actually been represented in sub-period IB. The beginning of this sub-period is marked by the appearance of barley and dish/bowl-on-stand. Associated ceramic industries from the earlier sub-period show continuity and include red, black-and-red, black, and grey wares. The main shapes comprise perforated legged-bowl, lipped or channelled bowl, water vessel, pedestal bowl, spouted vessel, bowl/dish-on-stand, etc. Decorative patterns of the earlier sub-period also continue. The fabric of pottery improves from coarse to medium, and proportion of painted pottery also increases.

The most important aspect of this sub-period is the appearance of a copper arrowhead (3.0 x 1.4 cm) made of sheet metal (Pl.4), and a fishing hook (1.5 x 1.0 cm) from the lower levels. These finds may be placed in early 3rd millennium BC and represent the earliest known copper artefacts in the Ganga Plain. These finds are similar to those found in Mature Harappan and Early Harappan contexts at Harappa, Lothal, Banawali, etc. Thus, we may suggest some contacts between Middle Ganga Plain and Harappan region, during the sub-period IB of Lahuradewa.

On the basis of earlier work, beginning of Period II at Lahuradewa was regarded to be marked by the appearance of Copper artefacts. However, considering their limited number, we were expecting that these may even be found in still earlier context. Now, the aforesaid finds of copper arrowhead and fishing-hook in sub-period IB have turned up in agreement with our presumption.

Other associated finds of sub-period IB include beads made of steatite, carnelian and semiprecious stones, finely made small bone-awl, a broken bangle of bone or antler, broken stone pieces, charred / un-charred bones in a good number, and grains and seeds in association of charcoal pieces. A small stone scraper (measurement 2.4 x 1.3 cm) is also encountered. Mud floors, post-holes and burnt clay lumps bearing straw and reed like marks represent structural evidence of wattle-and-daub dwellings.

On the basis of available C¹⁴ dates a time-bracket of circa 3000 to 2000 BC may be suggested for sub-period IB.

The rice husk clot dated by AMS method, as well as rice grains found in lower levels (Saraswat and Pokharia 2004), followed by the recovery of several intact grains, demonstrate fully developed morphological features of domesticated variety of rice (Saraswat & Pokharia 2004). Now with all these dates in hand two conclusions may be drawn regarding the Lahuradewa evidence: (1) rice cultivation was in vogue in the Lahuradewa area around middle of the 7th millennium BC (mid 9th millennium BP), and (2) barley was imported or grown at Lahuradewa by the earlier half of the 3rd millennium BC.

The excavations of 2005-06 have further enriched our perception regarding the presence of beads in sub-periods IA and IB. Some beads were found during the earlier work from the upper levels of sub period IB in trench YA2, qdts. I & II, but below that level even a single bead of any type was not recovered. However, during the subsequent excavations in 2005-06, a good number of steatite beads have been encountered in layers (12) and (13) of the same trench, which belong to lower and upper horizons of sub-periods IA and IB. A stone bead (possibly flint) was found from layer (13). A carnelian bead recovered in layer (14) is also noteworthy. The presence of a tubular bead and steatite beads from the lowermost layer (14) is also of considerable implications in the cultural stratigraphical sequence.

Period II of Lahuradewa is marked by the appearance of painted and plain black-slipped ware. Thickness of the deposits of this period ranges around 1.50 m. The deposits of this period have been found in all the excavated trenches. Other ceramics include red (plain and painted), black-and-red (plain and painted), black, and grey wares. The number of bowl/dish-on-stand and pedestal bowl increases in a considerable proportion. Their workmanship is apparently

improved. The decorative patterns of period I continue and show some innovations.

The most remarkable feature of this period is the construction of earthen storage bins or silos. During the earlier excavations about forty bins were exposed, this season's work has added eight more. The associated culture materials include terracotta beads, terracotta discs, pottery discs, stone objects (celts (Pl.7), muller and hammer), stone beads including those made of steatite and semi precious stones, terracotta wheels, bone arrow heads, points and caps, copper ring, fishhook, unidentified objects, bangle, wires and stone anvil.

A considerably rich quantity of charcoal including carbonised seeds and grains, and bones have been recovered from the deposits of this period. Hearths, floors, postholes, burnt clay chunks with reed impressions are the representative architectural components. Two radiocarbon dates available for this period are:

Period II Charcoal BS-1938: 1519 (1435) 1399 Cal. BC; BS-2150: 2012 (1884) 1750 Cal. BC.

Period III is marked by the appearance of iron artefacts. The associated ceramic industries are almost similar to those of Period II with a slight variation in fabric and levigation. The coarser variety decreases and fine fabric ceramics increase in proportion. Dish is an important addition in red and black slipped wares with fine fabric.

Earthen bins became non-existent, probably due to the introduction of big storage jars. The bone artefacts, heads of semiprecious stones, terracotta beads, iron artefacts, antler, and bone artefacts such as arrowheads and owls, are included in cultural assemblage. A number of armed clay hearths have been found, made in different directions and locations on mud floors. These hearths are comparable with the modern ones, employed for cooking the food.

Period IV, holding about 60-70 cm thick occupational deposit, is marked by the appearance of well-known NBPW. The associated ceramic industries are red ware, black slipped ware, black-and-red ware, and plain grey ware. Normally the ceramics of this period are made of well-levigated clay and comprise fine to medium fabric. Some of the sherds including NBPW, bear painted patterns. Other associated finds include terracotta beads, beads of semiprecious stones, bone artefacts, iron and copper artefacts and terracotta dabber. Burnt clay lumps bearing grass and reed like impressions, post-holes, rammed mud-floors and broken portions of clay hearths represent the dwelling structures of this period.

Period V is represented only by about 70 cm thick occupational deposit. It is characterized by the appearance of burnt brick structures and floors paved with complete or broken bricks. During this year's excavation, a burnt brick floor is unearthed in trench YA4. The pottery is represented mainly by red ware industry. Inkpot type lid, high-necked water vessel, pan with lugged handle, miniature vessel, and storage jar display varied shapes. These shapes may be placed in early centuries BC/AD.

The occurrence of the potsherds datable between 3rd and 6th centuries AD (Gupta Period) and glazed pottery from a few pits of Period II, sealed by the upper layers, suggest that the habitation somehow continued at Lahuradewa up to the early medieval times. However, the occupational deposits of this period are not represented in the stratigraphical sequence. The associated remains include terracotta human figurines, metal objects, and fragmentary bone pieces, some charred and bearing cut marks.

Observations

The results of excavations during 2005-06 at Lahuradewa have attested some of the conclusions drawn in the light of earlier excavations. Taken together the

available evidence, it becomes certain that the first settlers of Lahuradewa were growing rice during circa 7th millennium BC. They were using mostly coarse variety of handmade red and black-and-red wares from the very beginning and residing in wattle-and-daub dwellings, having clay plastered reed or bamboo screens. Aquatic fauna formed a considerable proportion in their diet. The presence of beads made of steatite and semiprecious stones from the lowest levels shows long-distance interaction. The appearance of copper arrowhead and fishing hook, dish-on-stand, barley, wheat and pulses, abundant number of steatite and other beads, spouted and pedestal vessels, a few painted potsherds, improvement in ceramic industries, etc., provide a new evidence to apprehend what was happening in the cultural advancement in this part of the country, 3rd millennium BC onwards. The granary extended over a considerable area shows surplus agricultural production around 2000 BC. The ancient site of Lahuradewa continued to be inhabited during the NBPW and subsequent periods up to the early centuries AD. It has emerged as a site of its own kind for the study of early agriculture in the Middle Ganga Plain.

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Note: For more details, please see Second Preliminary Report of the excavations at Lahuradewa District Sant Kabir Nagar, U.P. 2002-2003-2004 & 2005-06 in *Pragdhara* 16.

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Excavations at Abhaipur 2005-06, District Pilibhit, Uttar Pradesh

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The ancient site of Abhayapur is located one km west of the village Abhaipur (28° 18' N; 79° 45' E) in District Pilibhit. About 1.5 km east of the site flows the river Deoha. It is around 35 km east of Bareilly city on road to Bisalpur, the tehsil headquarters. The site, popularly known as "Abhaipur-Chena-Naktikhetā", is situated amid a vast tract of agricultural land and can be approached from the village by a cart route that runs through the site. Almost the entire site has been converted into an agricultural field, sparing only a portion on the southeastern side and the central part where a shrine of Lord Siva has been established. The site is full of big trees, such as *pakal*, *papal* (*Ficus religiosa*), *neem*, *bar* (*Ficus bengalensis*), *semal* (*Salmalia malabaricum*) and *eucalyptus*. There are some ancient wells present at various locations of the site. The site is a common meeting ground of the villagers and was once more than 1.5 acres in area. However, now only 130 X 90 m area is found partially preserved where investigations have been carried out.

The topography of the region is very simple. Apart from the major river Deoha, the land is dissected by a small rivulet which originates a few km north of the site from a pond (once a large reservoir) and forms the eastern

boundary of the site. A small bridge helps to cross over the rivulet. A brick bridge of British period made over this rivulet near the village Mahadeva preserves ample evidence of its being a larger stream even during the Colonial times. The people could have found this place much safer to settle down than near the river Deoha, famous for its devastating flash floods. Besides, there are two small ponds on the northwestern side of the site. Though the ponds are silted down now, they seem to have been quite larger in size anciently. The area, now totally deforested, was full of thick forest about 50 to 60 years ago as the old men in the village inform. There were many wild games, including tigers, in the forest and thus was a favourite hunting ground of the British (*District Gazetteer of Pilibhit* 1911).

The region is part of the ancient *Panchala Mahajanpada* and falls precisely in the *Purva Panchala* as the *Asthadhyayi* of Panini describes it (Biswakarma 1988:23). The Indian history, in absence of a regional history, is totally silent about this region. Even the early and medieval literature do not mention anything about this region. However, the region was shot to prominence during the rise of the Rohillas, to extirpate whom the army of the Sultans of Delhi had to march through the jungles of this

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region intermittently. The region was densely forested and was inhabited by the tribal folks. It is only in the beginning of 10th century AD. that the Rajputs followed by the Muslims occupied some places of the present Pilibhit District. Though Cunningham reports a few sites of historical importance, no further intensive survey of the district has been carried out till the date (Singh 2004).

Objectives of the Excavations

Alarmed by the possibility of its total extinction, owing to the rapid agricultural encroachment and land grabbing by the villagers, the archaeological wing of the Department of Ancient History and Culture, M.J.P. Rohilkhand University undertook salvage excavation in 2001 followed by two more seasons at the site with the following objectives:

1. To salvage as much archaeological and environmental evidence as possible through systematic excavations.
2. To identify regional cultural-processes, such as origin, development, decline and chronology.
3. Testing the long-standing issues and problems related to Painted Grey Ware culture.

Excavations

The "Lot-system" of excavation method was followed. At first an area of 5 sq. m. was divided into four quadrants separated by baulk lines of 0.5m. Every quadrant was given separate lot numbers. Repetition of same number in different quadrants was avoided. A "Lot" is a dig of three to four centimetres. All the materials or samples collected from one dig were given the same lot-number. Although the numbering of "Lots" was different in this method in comparison to the "Harris-matrix" method, yet both the excavation methods deal with identification and recording of different activities or matrices in a given area. The materials of each Lot were collected and recorded separately, which literally prepared a database of every three centimetres of the habitation deposit or an event at the site allowing the excavators to have a closer observation

of the site formation processes, patterning and distribution of artefacts, technological development and cultural change at a given time and space. Pits, etc., are, of course, marked separately.

2001-02: In this season, the southeastern part which was assumed to be fairly intact was selected for excavations. Two trial-trenches, one on the highest point (B7) of the site and other (E7) on the slope down to the eastern side, were laid. Later, another trench (E12) was laid further down in the southeast of the site. All the trenches (2 x 2m) were dug down to the natural soil.

2003-04: In this season three trenches (E3, F3 & E4) were laid down one after the other as the excavation progressed. All the trenches (5 x 5m in size) were taken in the southeastern part of the site, adjacent to each other, separated by baulk lines. However, excavations in none of the trenches were completed in this season.

2005-06: In this season the trenches E3 and F3 were reopened. Besides, a number of sondages were taken along the north-south axis, such as A15, AX9-NW, AX9-SW, AX13-NE, AX14-SE, BX13-NW, BX14-SW and IY26-SE. Other than the A15, which was 1 x 1m in size, all other trenches were 2 x 2m in size. All the trenches were either completely or partially dug down to the natural soil.

Stratigraphy and the Cultural Sequence

About 2.5 m of habitation deposit, with six distinct layers, was found in the main trenches (E3 & F3) in the southeastern side. The layers were similar in nature in terms of their composition and cultural association in both the trenches barring slight differences in the thicknesses and some local activities. For example, a thick sterile layer of black soil was found separating layer (2) and layer (3) of PGW period in the F3 trench. Evidence of black soil deposits was also noted in the trial trench E12. The stratigraphy is also more or less identical in the northern part of the site in trenches AX9, AX13, AX14, BX13 and BX14. However, in this side a thin layer (4) represented the Black-and-Red Ware (BRW) period. A few pieces of

ochre and Ochre Coloured Ware (OCW) were also noted in the bottom of this layer. The matrix of layer (4) was almost identical with the underlying virgin layer (5) which, however, was devoid of cultural materials. The stratigraphy of Trench E3 is described below.(Pl.1)

Layer (1): The surface layer of humus and sandy silt was about 4-15 cm thick. It was disturbed due to the growth of a kind of tall grass, locally called *bhara*, and also due to the agricultural activities. Grass rootlets, small pottery pieces and bone fragments were found in this layer. Some Northern Black Polished Ware (NBPW) potteries along with PGW were also obtained. Besides, broken bangles and some other minor objects of both these periods were noted in this layer.

Layer (2): This layer was 63-83 cm in thickness, greyish in colour with very distinct upper and lower limits and was comprised of sandy silt. Moisture level was less in this layer. The layer was quite hard. A number of pits were recorded in the upper part of this layer in the 2003-04 excavations, which were filled up with black soil. Some of these pits were found empty and some yielded bones and potsherds of NBPW period. A lot of potsherds were found embedded in the section along with some bone fragments and brickbats. Some live roots were also noted in it. There were at least four successive compact floors made of yellowish silt found in this layer. Besides, ashy patches and burning activities were also commonly registered. This layer was associated with the PGW culture.

Layer (3): This was a compact, homogeneous layer and was formed of clayey silt. It was 09-38 cm in thickness. A lot of moisture was present in this layer. It was yellowish brown in colour in damp condition and light yellowish colour in dry condition. The upper limit of the layer was very distinct while the lower limit slightly merged with the underlying layer. Some floor levels noted in this layer belonged to the PGW period.

Layer (4): This layer was similar to layer 3 in uniformity, compactness and composition. But it had some percentages of fine sand and was dark yellowish-brown in colour in

damp condition. This layer belonged to the BRW culture. The upper limit of the layer merged with the overlying layer (3). This was an undisturbed layer with thickness of 08-55 cm. The layer gradually descended down towards the east from a higher level in the west. The lower limit of this layer was not very distinct. Some disturbances were noticed in this level. Similar situation was also noted in the Trench F3. In this trench the layer was found sloping down to the north-western corner from all sides. Perhaps there were rain gullies or gullies formed due to surface erosions in the natural landscape of the site which were filled up by the people of BRW culture.

Layer (5): This silty clayey layer was 14 to 47 cm in thickness and brownish in colour. It was a compact and undisturbed layer. The layer was quite distinct in terms of colour and composition and was very damp. Some lenses of ashy patches and burning activities were noted in it. This layer also sloped down from western side to eastern side. Some fragments of OCW along with bits and pieces of ochre were noted in this layer. The pot-sherds were very few and the layer was almost devoid of other cultural remains. The ashy deposits noted in the lowest level of this layer were perhaps due to the surface clearing and burning of thickets by the first group of people on their arrival.

Layer (6): This was the virgin layer which yielded only a few stray bone fragments. It was clayey silt in composition, brown in colour and very damp in nature, obviously due to high level of water table since the region has several tanks and a river.

Although evidences of four cultural periods were noticed at this site, namely Period-I: Ochre Coloured Ware (OCW), Period-II: Black-and-Red Ware (BRW), Period-III: Painted Grey Ware (PGW) and Period-IV: Northern Black Polished Ware (NBPW) in their stratigraphic order, only the second and third cultures were represented substantially in the excavations. While the habitation area of the OCP culture remained elusive at the site, the evidence for the NBPW culture was meagre, as the entire site was almost brought under cultivation virtually restricting the

investigations to the eastern margin of the site.

Nature of Different Cultures

Period I: Ochre-Coloured Ware Culture

Although a thin homogeneous layer containing fragments of OCW along with bits and pieces of ochre were registered in the bottom of all the trenches, the habitational deposit of this culture largely remained out of reach owing to the limited excavations at the site. The layer was very damp, brownish in colour and silty clay in composition. Among the pottery fragments, a red slipped ware is noteworthy, which was, however, without any painted decoration. Made of fine grained clay, the ware was well-baked and generally comprised jars or jar/pots and dishes-on-stand. Besides, a coarse red ware with rusticated surface was also noted. The evidence seems to be quite similar to that of Hastinapur (Lal 1954-55:31).

Period II: Black-and-Red Ware Culture

Habitational deposit of this culture was noted in layer-4) capping the deposit of the OCW culture in all the trenches. Other than some incomplete mud walls, fragments of burnt wattle-and-daub structures and burnt floors, no residential structure was unearthed from the excavations. A partial hearth and a number of burnt patches or thin ashy deposits were found from Trench E3 and F3. Presence of burnt brickbats is conspicuous. These were well burnt and at no circumstance can be considered later intrusions. This is because the brickbats of PGW period and the sizes and quality of bricks of NBPW period were different from that of this period. Brickbats in BRW period are also reported from Atranjikhhera (Gaur 1983).

A lot of animal bones, charred fish bones, small bones and nail, perhaps of birds and turtle shells, were collected from this level along with bone artefacts like arrowheads and projectile points. From Trench AX13 a stone blade made of red sandstone was found along with a number of river pebbles and red sandstone fragments. These evidences help us to understand the food habits of the people and

implements used by them. The presence of a large number of finished and unfinished arrowheads suggests the use of bow as the main hunting weapon. An in-depth study of faunal remains is in offing which will allow us to know about the domesticated and wild fauna of the period. In absence of floral remains, barring some charcoal pieces, it is difficult to tell anything about the practice and modes of agriculture during this period. However, sites like Atranjikhhera and Lal Qila have yielded evidence for cultivation of rice and barley in this period (Gaur 1983; 1997:99-100).

The ceramic industry was quite developed in this period. A variety of potteries were manufactured by using fast wheels, such as Black-and-Red Ware, Black Slipped Ware, Coarse Red Ware, etc. The major types were jars, dishes, bowls, basins, vases, chalices of different types and sizes (Arora *et al.* 2001-02:122-130). These potteries are identical to those reported from other sites such as Atranjikhhera (Gaur 1983), Jakhera (Sahi 1978), Lal Qila (Gaur 1997), etc. Besides, a few hopscotch perforated discs, birdshots were also found belonging to this period.

Period III: The Painted Grey Ware Culture

The habitational deposit of the PGW period was easily identified by its light ashy colour, sandy-silt texture and non-uniform nature. However, a yellowish homogeneous layer (3), yielding PGW pottery, was also noted. This layer was found sandwiched between the greyish habitational deposit (layer-2), of PGW culture and deposit of the BRW culture (layer-4). A common feature of PGW culture was the presence of a large number of pits, which at times disturbed the underlying habitational deposits of antecedent cultures. PGW and BRW cultures shared many identical cultural traits, including ceramics.

The people continued to live in mud and wattle-and-daub houses. Though some brickbats were found, they did not seem to have been used for the construction of houses. No complete structure or house was noted. What were found were the partial remains of mud walls, collapsed walls of wattle-and-daub houses and successive mud

plastered floors. These walls were easily distinguished from the rest of the deposits for their compactness and brownish colour. A lot of burnt clay nodules with reed impressions on them were recovered from the excavations. Sometimes black soil was used to level the ground before preparing floors of the houses. No posthole was registered in this period.

Apart from the introduction of a number of new varieties of ceramics and iron tools, the techno-environment of this culture was by and large the same as that of the BRW culture. Bone tool making was well-developed in this period. Bow-and-arrow was still the favourite weapon of the people. Subsistence of the people was based on agriculture and stockbreeding. Hunting-gathering, fowling and fishing also contributed to the economy. Besides, iron and copper metallurgy, pottery manufacturing and trade played subsidiary roles. The presence of some semiprecious stone beads of agate, carnelian, jasper and crystal throws welcome light on well developed contacts with other communities during this period. Apart from these, people were using *ghata*-shaped beads of terracotta and copper bangles to embellish themselves. Hopscotch was a good pastime game. A large number of pottery discs was recovered from the excavations. These were found in many sizes, starting from 2.5 cm to 10 cm in diameter. Some of them had single and rarely double perforations in the centre. Some discs were exclusively made of fine clay. These were made in different sizes and thicknesses and intricately decorated with incised designs on the edges before firing. The shapes and sizes of these discs prompt one to relate them with weights. However, a few of them were attempted to be perforated from both sides. No religious object was found in the excavations.

Bone workshop: A bone workshop was discovered in Trench E3. This area was littered with bones and fragments of bones. There was a red burnt plastered platform with a fireplace in the centre and a brickbat and fragment of a grey ware dish on one side of it. Some pieces of charcoal, charred bones, finished and unfinished bone tools, a bead and lots of debitage or bone flakes were found from a

thick deposit of about 60 cm. Perhaps the workshop was functional for a long line. The occurrence of split bones along with longitudinally split canine, molar and incisor teeth of animals indicates that perhaps the sharp split teeth were used for splitting the long bones. The carpal and tarsal bones were preferably used for tool making. After splitting the bone to a preferable size, the bone marrows were cleverly avoided. Then using a sharp implement the bone fragments were narrowed down to desired shapes. Tools in different stages of manufacture were recovered from all the trenches. The technological studies of the unfinished bone implements found in the Painted Grey Ware complex at Allahapur allowed the excavator to work out different stages of their manufacture (Dikshit 1970-71:51-55).

The finished tools were polished with sandstone polishers and were heated in the fire for increasing the hardness. One such polisher (17.5 to 19.4 x 5.5 to 6 x 3cm) made of sandstone was found in Trench BX13. Bone tools like arrowheads and projectile points of different sizes were manufactured with this method. The styluses (with two pointed ends—one short and the other long) mentioned by some scholars as a category of tool may not be correct as these could be unfinished forms of projectile points. The arrowheads (2.1 to 6.6 cm long) were found in two varieties, two barbed and four-barbed. These were either flat or roughly conical in shape with cylindrical or square distal ends. The tangs of arrowheads were cylindrical in shape with a hole for holding the shaft of the arrow. An interesting characteristic of these arrowheads was two lateral circles. Perhaps the circles were symbolic representation of eyes of the arrows which were engraved invariably in every finished bone arrowhead and this continued well into the NBPW period. There was another kind of arrowhead without barbs and tang. It was shorter in size and conical in shape like a pointed bullet with a hole behind. The projectile points were tanged but devoid of barbs. The tangs were pointed in shapes which were fitted into the shafts. These were, however, devoid of symbolic eyes. Besides, there was a bead, a spatula made of bone and a few ear-studs like bone objects, perhaps broken parts of projectile points (Pl.2).

Ceramic Industry: Painted Grey Ware took over all other potteries in this period. A plain grey ware also continued along with the painted one. Besides, all other potteries of BRW culture remained part and parcel of the assemblage, viz. Black Slipped Ware, Red Slipped Ware in plain and painted varieties, Black-and-Red Ware, Coarse Red Ware and "perforated" ware. The vessels were mostly made of well-levigated clay and potted on fast wheels. The paintings were linear and geometric designs executed in black, orange and red colours. The common vessels were dishes, bowls and basins of different kinds. Besides, jars, jar/pots, vases and miniature pots and chalices were also found (Arora *et al.* 2001-02:122-130). The perforated vessels were found with three legs at the bottom. Besides, a channel-spouted bowl in Red Slipped Ware is noteworthy.

Burials: The most important findings of PGW culture at Abhaipur are the two human burials one of an adult and the other of a child. These burials were located in trenches

AX13; AX14, BX13 and BX14 on the northern side of the site, close to the cultivated land (Pl.3; Fig.1)

The adult burial was at first struck in the northeastern corner of trench AX13. Here a layer of compact black soil was found under a floor at a depth of 89 cm. Once the soil was removed, the ankles along with toes were exposed, which were later traced up to the knees. Since rest of the skeleton was lying inside the undug area, the excavation was extended to three adjacent quadrants. The black soil that covered the burial was literally spread across the trench. This soil spread was detrimental in finding the exact location of the burial or the lining of the burial. The body was perhaps interred in a shallow, narrow pit dug into the floor of a house. Therefore, it had acquired slightly curved posture with the waist down and head and legs in a slightly elevated position. It was an extended burial aligned slightly in NE-SW direction. The extant length of the skeleton is about 170 cm. Lying on its back, the skeleton was found



Fig. 1: The excavated child burial

slightly-tilted towards the right and the head was placed laterally facing to the right. The legs were placed in straight position with the right ankle over the left. The position of legs indicates as if these were tied at the ankle. The pelvis slightly sloped to the right. While the left arm was folded at the elbow and kept on the waist with the fingers hanging down, the right arm was peculiarly folded up at the elbow and the palm was kept against the chin. Some big fragments of potteries were found stacked at the waist of the skeleton. When these fragments were refitted a beautiful wide-mouthed, convex-sided bowl of Painted Grey Ware was formed. The bowl, 20 cm in diameter, is painted in red colour on the outer side, but in the inner side only the impressions of the designs can be noticed. The designs are linear in nature. The rim is painted with a thick red band on the outer side. Usually the potsherds are never kept so carefully. Perhaps the bowl, supposed to be offered to the dead, was accidentally broken and, therefore, the pieces were kept carefully near the grave. No other grave goods were found.

The child burial was found when the excavation area was extended to three adjacent quadrants in order to expose the adult burial completely. It was lying perfectly in N-S direction, with the head towards the north, 56cm below surface in the layer (2) of Trench AX14. This was also found below a floor level. The skeleton was very poorly preserved. Other than the long bones nothing survived properly. The skull was partially preserved and some of the rib bones were traced. The skeleton was placed laterally lying on its right hand. The legs were in flexed position. The right hand was kept on the waist. The ankles were totally destroyed by a thick root of a tree, which was found in decomposed condition. The extant length of the skeleton is about 71 cm. Total 19 teeth were collected. No grave-goods were found from this grave (Pl.4-6). Besides, an incisor tooth of a child was recovered from Trench E3.

Period IV: Northern Black Polished Ware Culture

At Abhaipur evidence of this culture was very meagre as the surface layer of the site was totally erased by the

villagers for agricultural purpose. A very thin habitation deposit of this culture was identified in the trenches E3 and E4. A burnt wattle-and-daub structure was found in Trench E4. Besides, two successive floors were also noted in these trenches. A number of pits were found filled with black soil, brickbats and potsherds in this period. This suggests that the uneven surface of PGW period was levelled up by the people to make it inhabitable. The surface was rammed hard and plastered with yellow silt. Generally, in absence of a proper habitation deposit, this culture was identified by the presence of ceramics and other antiquities like fragments of glass bangles, decorated terracotta mugs-like objects, *ghata* or water-pitcher shaped beads (Pl.7) and highly polished bone arrowheads. Some fragmentary iron objects and slag were obtained from this level.

The ceramics of this period constituted red and black varieties of NBPW sherds, retrieved mostly from the surface layer, Red slipped Ware and Coarse Red Ware. The common shapes were bowls, dishes, jars, basins and lids. Narrow-mouthed jar-pots and V-shaped bowls with flat bases were characteristic features of the associated ceramics. Ceramics also include very fine, sturdy Red Slipped Ware jars and perforated vessels with three legs.

A large number of glass bangle fragments were recovered from the excavations. These were found in two qualities, opaque (95%) and translucent (5%). The opaque variety occurred in three types, such as monochrome (57%), bichrome (39%) and polychrome (stratified bangles, 4%). The first type was found in two colours—green (in different shades) and black. There were a number of colour combinations noted in the second type, such as yellow band on the green base (or yellow on green), yellow on brown, red on green, red on purple, brown on green, green on brown, dark green on light, green, black on brown, and brown on black. The polychrome type was very rarely encountered with following categories: yellow-brown-green, grey-green-light green, etc. The cross-sections of bangles were mostly semicircular or semi-oval. Besides, roughly triangular, rectangular and rounded varieties were

Table-I

Sample No	Layers	BS No.	Age of sample based on half-life=5570±30 years	Calibrated Age (Years BP)	Calibrated age range (Yrs BP)
E2 (0.96-1.08 m)	3	2394	3730±260	4090	4440-3700
E3 (1.16-1.21 m)	3	2397	7000±100	7820	7940-7690
E4 (0.51-0.63 m)	2	2400	3140±140	3300	3470-3170
F3 (1.09-1.14 m)	3	2395	2940±140	3100 (1100 BC -PGW)	3330-2870
F3 (1.45-1.61 m)	3	2393	2310±120	2340	2430-2150
F3 (1.85 m)	4	2399	3140±140	3360 (1360 BC -BRW)	3470-3170

also present. The bangles were not made perfectly circular. The width and thickness were also irregular, which varied from 2.5 to 8 mm and 2 to 4.5 mm, respectively. The diameter of bangles ranged from less than 4 cm to more than 6 cm (Pl.8).

Brick well : In Trench AX9 a burnt - brick well was unearthed. This was the only structural evidence found in the excavations. It was made of semi-baked and wedge-shaped bricks. The size of the bricks was about 32.5 cm x 22 to 15.5 cm x 8 cm, which almost matched with that of Hastinapur (Lal 1954-55:106). The bricks were semi-baked, often with dark core, and crumbled down with little pressure. The outer and inner diameters of the well were about 1.7 m and 1.05 m. The well was partially preserved and the extant depth was about 1.8 m. It was found collapsed from the western side (Pl.9). Such brick wells have been called *burns* in Hastinapur excavation report (Lal 1954-55); may be due to their shallowness. Significantly, a gold bead was found from this trench but, outside the well.

Chronology: Six radiocarbon dates pertaining to different horizons have been provided by the Birbal Sahni Institute for Palaeobotany, Lucknow as shown in the table-I. Other than two dates from trenches F3, BS No. 2395 and BS No. 2399, all dates remain beyond the time-bracket of the

cultures and are either too early or late. Out of these two appropriate dates, the former 2940±140 (calibrated 3100 BP or 1100 BC) represents an early date for PGW culture and the latter 3140±140 (calibrated 3360 BP or 1360 BC) represents the BRW culture.

Conclusion

The extant agricultural activities, as mentioned above, have almost destroyed the site restricting the investigations to a narrow strip in the eastern margin. Because of this the actual residential areas of the cultures were not found in most of the trenches. The area that was excavated assuming fewer disturbances was close to the bank of the rivulet. Perhaps, the rivulet was quite active during those days and did not allow the people to construct permanent structures in the vicinity. Evidences of river activities in the BRW period, or prior to it, were noted from the excavations, such as soil erosion and gully formation in the eastern margin of the site. The people had levelled up the gullies at some places in this side by filling up with brickbats, potsherds and black soil. Such kinds of natural and human activities were noted in the trenches E12, E3, F3 and JY26. All these trenches marked the boundary of site along the bank of rivulet. However, later on, during the time of PGW period, perhaps the river was squeezed up partially due to the active human interference or expansion of settlement due to

population growth and also may be owing to environmental factors. Thus, there was development of activity areas and accumulation of habitational deposits further close to the rivulet.

Whatever may be the extent of the investigations carried out at this particular site, the results are extremely significant as many hitherto unknown aspects of the past lifestyle in upper Ganga Valley were unravelled. For example, the bone workshops and the burials of Painted Grey Ware cultures are the only evidences of their kinds so far been discovered. Albeit none of PGW sites excavated since 1944 by the Archaeological Survey of India (ASI) and various Universities, has yielded any evidence of human skeletal remains. In absence of such evidences, the PGW people were assumed to have cremated their dead bodies. However, this discovery may change this view.

To sum up, it may be noted that both the cultures, PGW & BRW, were village-based. People lived in mud houses with thatched roofs. Their economy was based on

agriculture, stock-breeding and hunting-gathering. They had the knowledge of metal working (copper and iron), pottery making, bead manufacturing and preparing fine arrowheads of bones and antlers. They were fond of hunting and bow and arrow was their favourite weapon.

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Excavations at Ramnagar: Discovery of a Supporting Settlement of Ancient Varanasi

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Ancient façade of Varanasi is glimpsed through both literary descriptions and archaeological findings. Two aspects of utmost importance for the study of history of this place are - antiquity and extant of this city. Both these aspects have been enriched by recent studies conducted in and around Varanasi. Particularly, spade of archaeologists has unveiled new evidence, which needs to be considered for the historical reconstruction of this city. On account of excavations at Rajghat, the earliest habitation of Varanasi was dated to *circa* 800 BC (Narain, A.K. & T.N. Roy 1977). Antiquity of occupation of this city could be pushed back for another four to five hundred years, as has been brought to light by the excavations at Aktha (Jayaswal 2000).

The archaeological and the literary evidence further suggest wide expansion of this city. Besides two localities, Rajghat and the nucleus of the modern Varanasi city, Aktha was perhaps the earliest part of ancient Varanasi. It was inhabited around eleventh/twelfth century BC. It was only after about two/three centuries that Rajghat was selected as dwelling area. Aktha and Rajghat appeared to have survived simultaneously as twin settlements for next five centuries. It was around *circa* fourth century BC that Rajghat entered the stage of Urbanization, while Aktha with

its rural base receded to the status of peripheral settlement/ locality till its last days (*circa* sixth century AD). Thereafter, the territorial expansion of the city was towards Pucca Mahal area (west of Rajghat), which still is the heart of Varanasi. This tendency is well-recorded in the accounts of the Chinese traveller Weing Chuang who visited Varanasi in the sixth century AD. The nucleus of the city as per his description was south-west of Sarnath, calculated to be the Pucca Mahal area (Jayaswal, In press). Still later, the boundaries of this city extended up to the Assi River. On account of these findings successive expansion appears to be the most prominent pattern for the historical makeup of Varanasi. It could also be ascertained that the nucleus of the settlement was surrounded by dense concentrations of supporting settlements (Jayaswal 2002). Recent excavations (2006) at Ramnagar indicate that expansion of the territory of Varanasi was also on the opposite bank beyond its south-western boundaries. Whether Ramnagar was a satellite settlement or part of the ancient city of Varanasi is yet to be determined on firmer grounds. But, findings of Ramnagar indicate that both the sites had very close interactions with each other, and the former was perhaps a craftsmen's colony catering to the needs of Varanasi city.

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Situated on the right bank of the Ganga River, Ramnagar (83°1.7' E; 25° 16' N) is a small settlement known for the fort of Maharaja of Banaras. This place is approachable by metal roads from Varanasi and Mughal Sarai. Since Ramnagar is located on the opposite bank of the Ganga, near the southern periphery of the Varanasi township, one needs to cross the river while approaching the site from Varanasi. Three bridges - Malviya Bridge, Shastri Bridge and Pontoon Bridge connect the city of Varanasi with that of Ramnagar. Through Malviya Bridge the site is about 15 km from the Varanasi Commissioner's Office, while it can be reached by 8 km long road from Banaras Hindu University through the Shastri Bridge. The shortest route to reach Ramnagar is through Pontoon Bridge, which covers about 4 km stretch from the Banaras Hindu University. The modern settlement of Ramnagar is small and is confined primarily around the fort. The market and the Police Station are located on the sides of the main road just in front of the fort.

Ancient habitation deposit at Ramnagar is spread on a stretch of about 3 km between the Fort (located on the northern end of the mound) and the Shastri Bridge (on the National Highway). But the ancient settlement appears to be confined to the bank and does not extend beyond half a kilometre from the river side. The river side near Ramnagar has high embankment (about 15 m high from the water level), over which rests ancient deposits (of about 10 to 15 m). The most promising topography of the ancient site is deep erosion and gullies, which appears to dissect the bank in a series of small units or mounds. The promising heights are utilized as *ghats*. Each ghat - be it Hanumanghat, Kuttaghat, Golaghat, Koriyaghat, Pipraghat or Oriyaghat, is on one mound and is used by local people as bathing place and/or navigation port. That is because the depth of water at these places is considerable.

During explorations conducted at Ramnagar in the year 2005 by the first author, Oriyaghat was identified as an undisturbed area with thick habitation deposit yielding Northern Black Polished Ware and Black-slipped Ware potsherds. It was for this reason and also due to the availability of land for digging that Oriyaghat was selected

for excavation. The excavation was conducted between March 21 and April 30, 2006 by Banaras Hindu University in collaboration with Juana Pravaha, the Centre for Cultural Studies, Varanasi. Western end of this mound facing the river is extensively eroded. While southern side, too, was steeply eroded/vertically cut both by nature and human actions. In view of obtaining the chronology of ancient habitation deposits at Oriyaghat locality, a 5 x 5 m trench (A1) was taken near the centre of the mound. Besides, in view to reach the lower levels early and also to ascertain the nature of the peripheral deposits, trenches were also planned along the sloping sides of this mound. Such portions were found suitable for the purpose where upper levels were removed and also where traces of compact earth heaps were noticeable. Trenches C3, B2 and C2, where accordingly planned following the format of grid system of layout (Fig. 1).

Stratigraphy in Trench A1

In Trench A1, natural horizon was reached at the depth of about 9.50 m below the surface. This layer composed of compact fine-textured yellow clay and was overlain by a well-sorted yellow-green earth. The habitation debris over this horizon was divisible within 16 layers. On account of pottery and other antiquities, the unearthed deposits were classified in Gupta, Kushan, Post-Northern Black Polished Ware, Northern Black Polished Ware and Pre-Northern Black Polished Ware periods.

Period V: Confined primarily to the Layers 1 & 2 and the pits dug through these layers, the finds of this period included a large quantity of Red potsherds, a few areca-nut beads, a few broken parts of moulded terracotta figures, and a clay boat. The typical examples of stamped pots, moulded spouts and style of human depictions in the clay models from the uppermost horizon at Oriyaghat has been assigned to Gupta period.

Period IV: The archaeological debris from Layers 3-6 was of Kushan times. This horizon was marked by structural activities in the form of walls of large bricks (29 x 22 cm) and rammed floors. The associated red pottery

was characterized by Kushan features, - predominance of incurved rim and flaring sided bowls, sprinkler, large pots, inkpot lids, handled pans, etc. A sealing engraved in Kushan Brahmi was an added support to the identification of this horizon. Other important findings were terracotta figurines, antlers, bone points and an antimony rod of copper. It may be mentioned that from the surface a good collection of terracotta human figurines bearing Kushan stylistic features has been collected by local people. A considerable part of the deposit of this period was disturbed by pits, which were dug mostly to rob bricks.

Period III: The Post- Northern Black Polished Ware remains (obtained from Layers 7-9) were marked by bright red/orange-slipped pottery, a copper cast un-inscribed coin dateable to third/second century BC (retrieved from Layer 8), parts of antlers with use marks on their pointed tips (appearing perhaps during tilling operations), beads of stones and a number of successive floors made of rammed brick-bats, pottery and compact earth. A drain attached with a soak pit (?) was another important finding of the period. On account of the nature of antiquities and the coin, this period appears to be comparable with Period II (*circa* 200 to the beginning of Christian era) of Rajghat (Narain & Roy 1977).

Period II: The Northern Black Polished Ware phase in this trench was retrieved from Layers 10-15. The ceramic in this period was marked by Grey and Red Wares and restricted proportion of Northern Black Polished Ware. This phase appears to be similar to the Period I B and C (*c.* 600-200 BC) of Rajghat (Narain & Roy 1977). A number of successive floors indicate continuous habitation of this mound for a long duration.

The most dominant ceramic of this period was the Grey Ware, which had high concentration in the upper half deposit. It was noted for instance that the frequency of this ware was 30-35% in the Layer 10, while about 35% in Layer 11, and 20-30% in Layer 12. In the lower levels their proportion decreased further (in Layer 13 about 20% and in Layer 14 about 15%). The other main associated wares were the Northern Black Polished Ware, Black

Slipped Ware and Red Ware. This Period is divisible into two sub phases, - Late and Early (Figs. 1.2 & 3).

Remains of Period II Late Phase (Layers 10, 11, 12) is marked by dominance of Grey Wares, which was associated with restricted number of thick and degenerated Northern Black Polished Ware potsherds. This phase appears to be similar to the Period IC (*circa* 400-200 BC) of Rajghat. A number of successive floors were exposed in this horizon. The noteworthy findings of this phase were carnelian beads, bone points, terracotta wheel and iron objects.

Period II Early Phase is associated with Layers 13, 14 & 15. The dominance of Grey Ware decreased considerably in this phase. But both the traditions of the painted and the unpainted varieties continued. Occurrence of Northern Black Polished Ware becomes prominent. Though the proportion of this deluxe ware is not very high, in this trench, two distinct types - the monochrome with black shining and the bichrome with variety of paintings - were noted. There were also potsherds with graffiti marks and one or two inscribed letters in Brahmi. All these features compare very well with the findings of Period IB (*circa* 600-400 BC) of Rajghat (Narain & Roy 1977: 115-116; Pl. XXVII). The Black-slipped Ware occurs from the middle of Layer 13 and it forms a distinct tradition in Layer 14. The other finds included pottery discs, terracotta balls and beads. Intense structural activities in the form of rammed floor at close intervals were noteworthy.

Period I: The Pre-Northern Black Polished Ware horizon at this site was identified from Layer 16 (0.75-1.0 m thick). The Black-slipped Ware, though was the dominant ceramic tradition, occurrence of Black-on-pink/pale Red Ware was also a noteworthy category (Fig. 4). The surface of this ware was treated with thick slip over which geometric designs in bold black lines were engraved. Other findings included a large number of small and medium-sized terracotta balls, wheel and an unidentified stone piece. Series of floors made of rammed potsherds and clay was exposed. A mud structure (?) formation was also observed at one corner of this trench.

The early and late Northern Black Polished Ware deposits in this trench were marked by preponderance of Grey Ware, which emerged in Layer 9 at the depth of around 4.15 m below the surface. Its continuation upto layer 16 and its varieties are noteworthy features. Besides painted potsherds, grey ware in a variety of shades - light grey to steel grey and thin to thick fabric form the collection. A number of potsherds also had dark grey/pale black slip at their outer surface and were un-slipped in the interior providing the look of black-and-grey ware. It is the proportion and variety of grey ware which separates Ramnagar from Rajghat, where although Grey Ware occurred in Period I (circa 800 - 200 BC), it appears to be limited and restricted in surface treatment. The other significant observation in Trench A1 at Ramnagar was the history of occurrence of Black-slipped Ware. It was though restricted in Layer 13 (first appearance at the depth of 6.80 m below the surface), this ceramic gradually becomes frequent in Layers 14 and 15 when Northern Black Polished Ware is also associated with it. But its preponderance becomes glaring in Layer 16, when traces of NBPW potsherds could not be obtained. Instead painted pale red and grey potsherds become distinct.

Stratigraphy in Trench C3

The habitation horizons unearthed in Trench C3 were more or less similar to Trench A1 (Fig. 5). Except that a very imposing platform made of rammed brick bats, potsherds and *kankar* was encountered at the depth of 4.30m. This 0.78 m thick structure was superimposed by eleven layers. Layers 1-3 were of Gupta period, while Layers 4-7 rested against a Kushana brick wall. The overlying Layers 8, 9, 10 & 11 could be assigned to Late Northern Black Polished Ware period. Below the platform lay five distinct layers (12-16); this yielded very good quality of NBPW potsherds in large quantities. Fine monochrome Northern Black Polished Ware potsherds had good concentration in Layers 13, 14 & 15. It could be conjectured that the platform was constructed sometime during the Late Northern Black Polished Ware period. Extension of this trench to further south (Trench D3) revealed a platform, which retained pits filled with pots

and ashes, and had a cover of water-borne deposit. This evidence and also streaks of sand in this trench provided evidence for the rise of the river level during Northern Black Polished ware times. Evidence for flood was also unearthed from the trenches C3 and B2-C2 at the depth of about 5 meters below the surface. The thick platform/embankment, appear to be constructed as protective device to the frequent rising water levels of the river. Similar evidence has also been reported from Rajghat (Narain & Roy 1977), where embankment was unearthed from Period IB. Incidentally, the topographical features of the Rajghat mound also are similar to the ancient deposits of Ramnagar, as both are located on the cutting side of the river over thick alluvial deposit.

Trenches B2 and C2

In view to confirm the nature of platform with compact earth deposit, Trenches B2 - C2 were excavated. Though the rammed platform appeared to be damaged in this trench, the overlying yellow earth deposition could be seen distinctively. The upper portion of this deposit, too, was badly damaged by pits. But it was in the Trench B1 and C1 that some rewarding evidence was unearthed, as the NBPW horizons of Trench C3 revealed distinct evidence for pottery making. Not only NBPW potsherds were found in very large numbers, but these were in a range of colours resulting from various types of firing conditions. Also thick layers of whitish ash bands were found in succession in which some half-baked potsherds were also embedded. This locality thus was identified as the production centre of the deluxe ware - the Northern Black Polished Ware.

The Northern Black Polished Ware horizon of the Trenches C3 and B2-C2 were rich in antiquities like stone weights, beads, copper objects like bowl and cut bone pieces, etc. One of the important antiquities of Trench B2-C2 was a copper coin of Mitra rulers of Kausambi (circa third/second century BC). It was found from Layer 4. But, the most significant discovery was a large number of potsherds engraved in Brahmi letters and/or bearing other graffiti symbols. Similar NBPW and Black-slipped Ware potsherd have also been reported from Period IC and IB

of Rajghat, which have been classified under potsherds with graffiti marks (Narain & Roy, 1977:115-116; PL XXVII). In every likelihood, Ramnagar appears to be a workshop site for the manufacture of Northern Black Polished Ware, which was marketed to the contemporary cities. Varanasi (Rajghat) was a contemporary city, which used this deluxe ware in large quantities. The inscriptions on the potsherds of NBPW are added evidence to the presumption of marketing of the pots from one settlement to the other. The surface indications at Oriyughat locality suggest that Ramnagar was perhaps also a bead-making centre. This aspect is yet to be confirmed by the excavations. But the findings of chips of semi precious stones, finished and semi-finished beads which are collected from the site after rains are noteworthy in this regard.

Concluding Remarks

Even though restricted in nature, the excavations at Ramnagar indicate that the site has potentiality to unveil not only the history of this very place, but shall also enrich our knowledge about ancient Varanasi in particular, and makeup of city sites of the early historic times of the middle Ganga plains in general. In view to its close proximity and export of utility items like deluxe wares, semi-precious stone, beads, etc., Ramnagar can be taken as one of the satellite settlements of ancient city of Varanasi. It may be recalled that in the list of names for ancient Varanasi in Yuvanajaya-Jataka, one name 'Ramma' also appears (Cowell 1990:75-78). Ramnagar's strategic location further suggests that it was also a trade-based settlement, connecting ancient Varanasi with other settlements of *Uttarapath* and *Dakshinapath* both by water and land routes. A number of features, which have emerged from the last season's excavations, however, need to be confirmed by further investigations at this site.

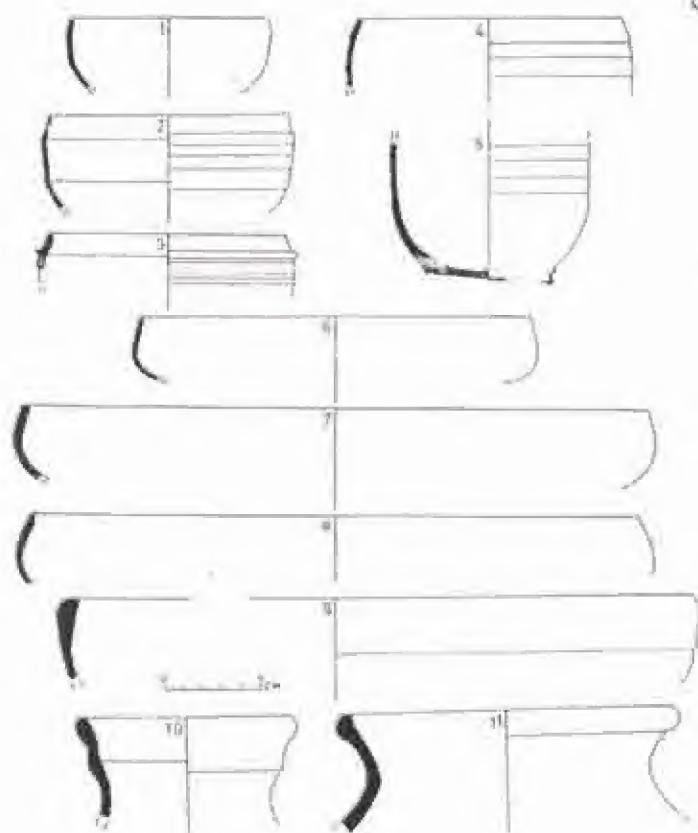


Fig. 1: Black Slipped and red wares of Period I; Ramnagar

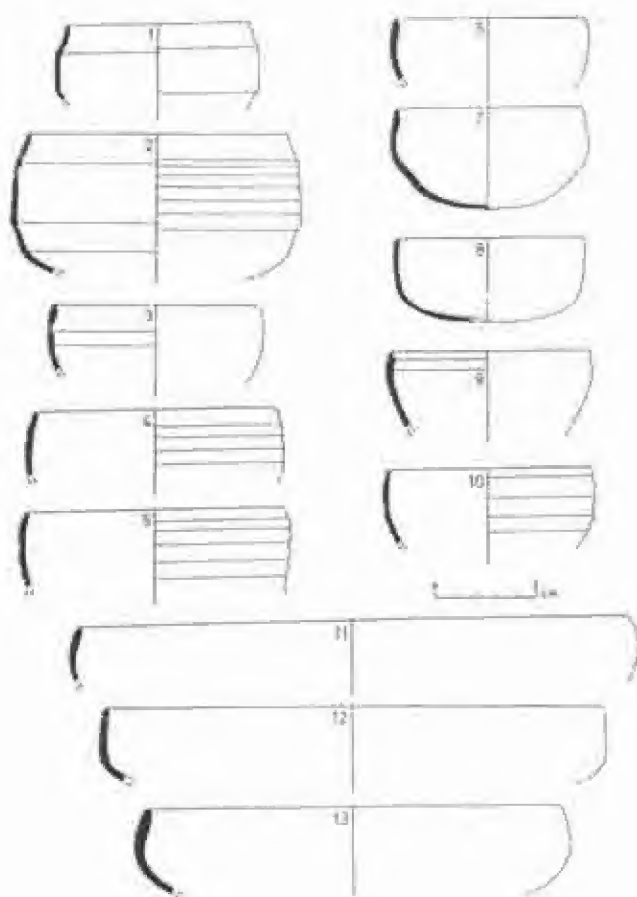


Fig. 2: Bowls and dishes of Period II A, Rammagar

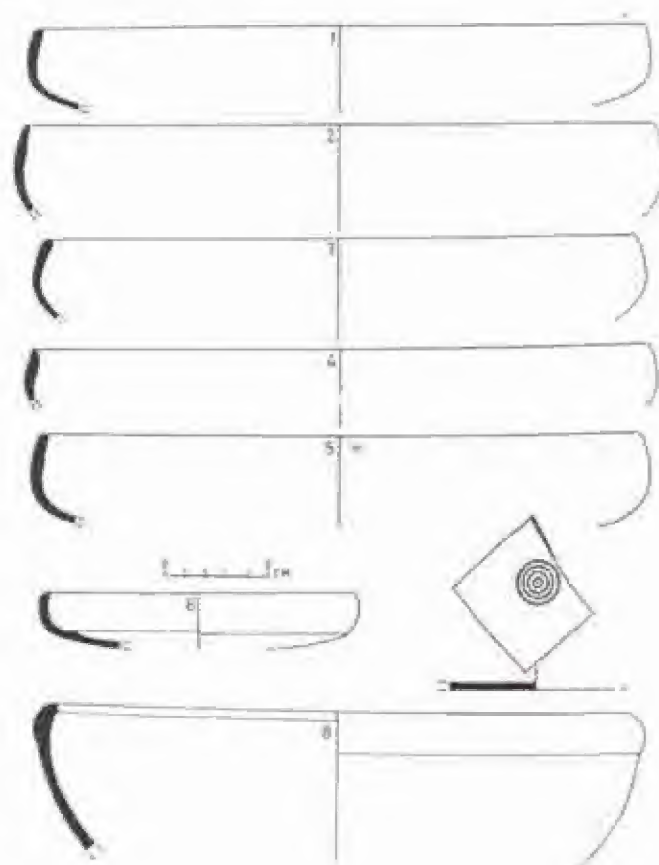


Fig. 3: Dishes of NBPW and black slipped ware (1-7) and basin of red ware (8), Period II A, Rammagar

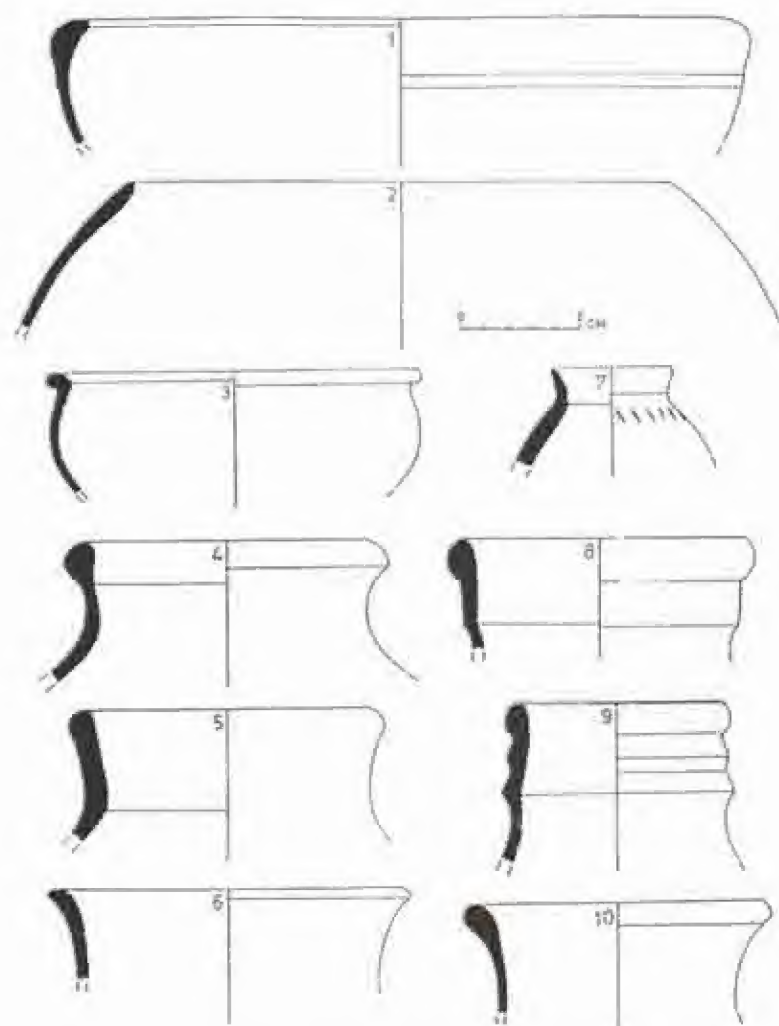


Fig. 4: Some important red ware sherds from Period II A; Ramnagar.

Anai: A Settlement in the Varuna Region

VIBHA TRIPATHI AND PRADYAKAR UPADHYAY*

Ancient Varanasi is located on the bank of the confluence of the two rivers, the Varuna and the Ganga. The Varuna is a relatively lesser known river compared to the Ganga; however, both are closely interlinked with the history of the holy city of Varanasi. A need was felt to explore the region traversed by the Varuna as it formed an integral part of the Varanasi region or ancient Kashi Janapada. The exploration at the first phase was conducted along the present course of the river. The hydrogeomorphological map (Fig. 1) of the area provided a good picture of the palaeochannels which facilitated the extensive exploration in the next stage. We could locate more than hundred sites on the bank of the Varuna and its tributaries. As a result of the soil degradation of the region, it would not have been possible to locate many of the sites on the palaeochannels without the help of the satellite imageries.

The site of Anai, locally known as Anei (25°27' 5" N; 82°44' 20" E), is located about 35 km northwest of the district headquarters of Varanasi on Varanasi-Jampur road, about 15 km northwest of Babatpur airport (Fig. 2). The upper part of the mound was largely disturbed by the villagers. The stratigraphical sequence may be made out almost clearly from the section exposed as a result of

cutting and levelling of the mound for agricultural purposes. The evidence of a palaeochannel running along the modern village suggests that the region near to the site must have been drained by the river in its heyday. Folk memories substantiated by the telltale signs of a river indicate that the river Basuhi once flowed through the above dried channel. It is corroborated by the satellite imageries showing a palaeochannel running for a few kilometres side by side the present course of the river Basuhi (Fig. 1). Shifting of the river and environmental fluctuations as revealed by the saline deposit could be the possible causes of desertion of the site during different cultural periods.

There are three mounds at Anai and the ancient settlement extends for about a kilometre along the right bank of the palaeochannel (Fig. 3). A small shrine stands on the western portion of the mound where upper deposits are still traceable on a very limited area of about 100 sq. m. At this point the extant height of the mound is about 6.00 m. A canal and a link road pass through the southern and northern sides of Mound 1. The present village and Bazar of Anai occupy virtually the whole of the Mound 2 (maximum height about 5 m). Mound 3 (approx. 1 m high) is confined to a small area on the northern bank of the

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palaeochannel opposite Mound 2.

Cuttings

Trench No. 1 was taken in the mangrove on Mound 1, closer to the palaeochannel. It yielded a very thin deposit of 40 cm. The deposit was apparently disturbed due to human interventions like construction of road and planting of the mango groves. Trenches were also laid out on the main mound and its southern and western sides to determine the complete cultural sequence of the site. Two trenches (AA-2 and AA-3) of 5 x 5 m were laid on the highest part of the mound. In addition, two other trenches AB-2 and AB-3 were also excavated (Fig. 4). The upper layers belonged to the Early Medieval times which helped us date the final desertion of the site. Study of the ceramic assemblages with those from Rajghat indicates that the desertion of the site must have taken place between the 7th and 9th centuries AD.

Immediately to the north of the canal, six more trenches were laid towards the eastern side of Mound 1 which were marked as AE-3, AE-4, AF-3, AF-4, AG-3 and AG-4. On the other side of the canal, almost parallel to the above area, two 5 x 5 m trenches (AE-10 and AF-10) were laid to ascertain the continuity of the cultural activity. The

upper levels are highly damaged due to cutting and levelling for agricultural purposes whereas the lower level deposits are less disturbed.

The western and north-western sides of the main mound were seemed to be better preserved, especially on the lower levels. Human occupation of the site during the NBPW period could be ascertained here right from the upper layers. In this area, two trenches (XK-7 and XN-1) were laid on the northern side of the canal and one trench (YB-10) was laid to the south of the road.

Since the present village and Bazar of Anai covered the whole of the mound-2, no archaeological excavation could be extended to that side of the mound. However, one trial trench measuring 2 x 2 m was laid out on Mound 3 to know the nature of deposit and extent of the earlier culture.

In total, seventeen trenches were taken up in different parts of the site. Amongst them nine reached up to natural soil providing adequate evidence for the stratification of different cultural periods of the site. Given below is a table of position of layers in various trenches in excavations at Anai.

Table 1: Position of Layers in Various Trenches

Trench	Excavated Area	Period	Layer	Depth
AA-2	25 sq m.	Pd. III	Lr. (1) to (6)	0-215cm
		Pd. II	Lr. (7) to (9)	215-305 cm (rest unexcavated)
AA-3	25 sq m	Pd. III	Lr. (1) to (5)	0-160 cm (rest unexcavated)
AB-2 and AB-3	23 sq m	Pd. III	Lr. (1) to (6)	0-220 cm
		Pd. II	Lr. (7) to (14)	220-500 cm
		Pd. I	Lr. (15)	500-555 cm (Natural soil)
XN-1	9 sq m	Pd. II	Lr. (1) to (3)	0-60 cm
		Pd. I	Lr. (4) to (5)	60-100 cm (Natural soil)
XK-7	9 sq m	Pd. II	Lr. (1) to (2)	0-55 cm
		Pd. I	Lr. (3)	55-75cm (Natural soil)

AF-4	9 sq m	Pd. II	Lr. (1) to (6)	0-190 cm
		Pd. I	Lr. (7)	190-225 cm (Natural soil)
Ag-4	9 sq m	Pd. II	Lr. (1) to (5)	0-170 cm (rest unexcavated)
AE-4	9 sq m	Pd. II	Lr. (1) & (2)	0-35 cm (rest unexcavated)
AF-3	9 sq m	Pd. II	Lr. (1) & (2)	0-40 cm (rest unexcavated)
AG-3	9 sq m	Pd. II	Lr. (1) & (2)	0-40 cm (rest unexcavated)
AE-3	9 sq m	Pd. II	Lr. (1) &	0-35 cm (rest unexcavated)
AE-10	25 sq m	Pd. II	Lr. (1) to (3)	0-75 cm
		Pd. I	Lr. (4)	75-110 cm (Natural soil)
AF-10	25 sq m	Pd. II	Lr. (1) to (3)	0-80 cm
		Pd. I	Lr. (4)	80-110 cm (Natural soil)
YH-10	9 sq m	Pd. II	Lr. (1) to (4)	0-60 cm
		Pd. I	Lr. (5)	60-80 cm (Natural soil)
I	9 sq m	Pd. II	Lr. (1)	0-40 cm (Natural soil)
M-3	4 sq m	Pd. III	Lr. (1) to (3)	0-100 cm (Natural soil)

Cultural Sequence

The excavations revealed that Mound I was initially inhabited during the pre-NBPW period and continued up to the late phase of NBPW period (around 200 BC) without break. During the late phase of NBPW period the Mound I was deserted due to unknown reason. There are some indications that Mound 2 was populated during the Kushana and Gupta periods. Although a few bricks of Kushana and Gupta periods were recovered from the Anai village, it could not be found in excavation. Villagers claim that these bricks are frequently found from a depth of about 1-2 m. Although surface finding from Mound 2 had provided bricks of Kushana and Gupta periods, it could not be excavated as it is densely populated by Anai Bazar and Anai village. However, the Kushana and Gupta deposits could not be found from regular deposit of Mound I. The late NBPW phase marks the desertion of the site and after a period of 900 years the Mound I was reoccupied

during the Early Medieval period.

The total cultural deposit of Mound I was found to vary from 0.40 m to 5.55 m. The excavation revealed three-fold cultural sequence.

- Period I : Pre-Northern Black Polished Ware Culture (c. 900 BC - 600).
- Period II : Northern Black Polished Ware Culture (c. 600 to 200 BC).
- Period III : Early Medieval Period (c. 700 - 1000 AD).

Pre-Northern Black Polished Ware Culture (c. 900 - 600 BC)

Period I was represented by maximum 0.55 m thick cultural deposit belonging to the early Iron Age. It could be exposed in a very limited area. The small finds of this

period comprised of an iron sickle, eight bone points, one semi-precious stone bead, eighteen pottery discs, one terracotta bead, four pieces of stone cores and chips, two stone raw materials, iron slags and other scattered pieces of raw material used in manufacturing stone objects. No copper object was recovered from this period. One baked circular terracotta cake (5 cm thick and 13.5 cm in diameter) of indefinite use has also been recovered from this period. The discovery of burnt clay lumps with reed marks indicate that the earliest inhabitants of the site lived in wattle-and-daub houses.

The main ceramic industries of this period are Black-Slipped Ware and Red Ware. A few pieces of coarse Black-and-Red Ware without any surface treatment have also been recovered from trench XN-1. In Black-Slipped Ware, plain bowls, pedestalled bowls, beakers and dishes are the main types. In Red Ware, bowls, perforated legged bowls, dishes, goblets, basins and vases of medium and coarse fabrics are the principal types. Bowls of medium fabric are common in Red Ware but the Black-Slipped Ware specimens range from fine to medium in fabric (Fig. 5). The Black-Slipped Ware of middle Ganga plain shows a high standard of ceramic technology. Many of the Black Slipped Ware specimens are close to NBPW in their appearance, that comes in use appears in the succeeding period. One may guess that these bowls might have served some special function. Rusticated ware and a few sherds of corded ware have also been recovered from this period which suggests cultural connection with Vindhya-Kaimur region during the Pre-NBPW period.

Northern Black Polished Ware Culture (c. 600 to 200 BC)

Period II was marked by occurrence of the NBPW (Fig. 6) with a maximum 2.80 m thick deposit on the mound. Other ceramic assemblages of this period comprise of Black-Slipped Ware, Grey Ware and Red Ware. The pottery of this period is well-fired and generally made of fine grained and well-levigated clay. Straight-sided corrugated bowls, dishes with incurved rims are the

principal types in Black-Slipped Ware, Grey Ware and NBPW. Other types of this period are dishes, vases and basins of Black-Slipped Ware, Grey Ware and Red Ware. Bowls, lipped basins and vases are the main types in Red Ware. Among the characteristic types of NBPW, mention may be made of bowls with flanged and corrugated sides, sharpened, nail-headed, out-turned and featureless rims. As compared to other major sites of the NBPW period such as Rajghat and Agiahir, the frequency of NBPW is relatively small. However, steel blue, black and silvery shades of NBPW are very common with occasional pieces of chocolate colour. A fine piece of painted sherd of NBPW (red painting on black surface) and a few decorated sherds of NBPW having impressed design of elaborated sun symbol at the centre of the inner side of the vessel are noteworthy.

The most important discovery of period II is a kiln, which was used for brick making. The size of the kiln was approximately three meters in diameter and its depth was about 0.55 m. Upper portion of the kiln (nearly up to 15 cm) was made of levigated clay while the lower 40 cm portion was cut into ground. Bricks at various stages of baking have been found from this kiln. Average size of a brick is 24 x 16 x 6 cm.

The inhabitants of this period lived in mud houses. Nevertheless, brick structures may not be altogether lacking since bricks of the similar dimensions of the NBPW period kiln variety have been found to be re-used on the site. A ghost wall was also traced in this period in trench AA-2. Remains of floors, and ovens were recorded in this period. Ring-wells are found in the late phase of this period. A thick burning activity was also noticed in the late phase of this period. The small finds comprise of three copper and ten iron objects, 24 bone objects including points, seventy-two pottery discs, four glass bangles, ten stone objects, eight stone core, chips and lumps and many beads of semi-precious stones. Besides beads, terracotta objects include wheels, toy cart, disc, bangle, skin rubber, weight and dabber.

Early Medieval Period (c. 700–1000 AD)

Cultural deposit of Period III with maximum thickness of 2.20 m was found in a very small area. The inhabitants of this period reoccupied Mound 1 after a long period of time once the NBPW culture vanished from the site. However, the cultural gap is not seen in stratigraphy but potteries and other antiquities suggest a gap of about 900 years between Pd. II and III at Mound 1. The inhabitants of Period III used the deposits of Period II to raise the ground and as filling for making the floor. Consequently, we find sherds of Pd. II in these layers of Pd. III, especially in layers of Trench No. AA-2, AA-3 and AB-2. A mud house was also traced in this period. An interesting find is a series of ovens presumably used as community hearths possibly for some ritualistic purposes. The structural activity and other finds of this period show that this area was possibly used as a religious complex during this period. Mention may be made of five ovens closely made at different levels. This area was presumably used for cooking on special occasions. However, absence of baked bricks in this complex is noteworthy. Antiquities obtained from this period include thirty-nine terracotta objects, nine pottery discs, eight stone objects, two stone cores, two copper objects, nine iron objects, numerous glass bangles, five glassy materials, one shell (gastropod), one mica piece, three cowries and two copper coins.

The ceramic industry of period III comprises essentially of Red Ware (Fig. 7). The principal types include various types of vases, basins, cooking vessels, storage jars, *parat* and miniature vessels. Cooking vessels (*handi*), spouted vessels and *parat* were recovered in a large quantity from a large pit. Only a little wear and tear and soot marks suggest that these vessels were used only once.

Observation

There was a profusion of village settlements in the middle Ganga plains right from the Pre-NBPW Black-Slipped Ware/Black-and-Red Ware using phase. Even remote areas away from major rivers in the middle Ganga

plains were well populated as attested by settlements like Anai situated on a minor tributary of Varuna.

Presence of iron slag, iron sickle and a few small fragments of unidentifiable iron objects indicate the use of iron was common in this region in the pre-NBPW period. Finding of cord impressed pottery and siliceous stones suggest their connection with Vindhya-Kaimur region. No copper object was found from Period I which pointed towards the scarcity of copper in this region.

Anai grew into a prosperous village settlement during the NBPW Period. This could be a second order settlement in relation to Rajghat of ancient Varanasi. A relative richness in NBPW, presence of a brick kiln, ring-wells and a variety of antiquities in a large area point towards this fact.

Recently excavated site of Agiabir forms one arm of the triangle. The other two being Anai-Rajghat and Rajghat-Agiabir. There is evidence of interaction between these three arms.

A unique feature noticed in the excavation was the presence of innumerable identical cooking vessels that were disposed of in a pit. Another interesting feature was the occurrence of a large number of broken glass bangles, and closely made series of ovens within a small area. They seemed to be the remnants of some rituals, similar to the present-day '*Karahi puja*' prevalent in eastern Uttar Pradesh and Bihar. This is further corroborated by a good number of sculptures found at the site.

A series of wells at regular intervals which were noted in course of exploration around the site is suggestive of a route taken by travellers in ancient times. Some of these wells with ancient bricks are still in use. It is important to point out that in ancient times, land routes between villages and towns were equipped with facilities such as wells and inns for travellers. Such facilities might have been provided in Kashi Mahajanapada also.

Conclusion

During the NBPW period the site of Anai was primarily in the nature of a developed village settlement that was first occupied by the Black-Shouldered Ware using people in limited scale somewhere around 1000 BC. The next phase, i.e., NBPW period, manifests an expansion in settlement area. Numerous examples of techno-economic activities of the NBPW users have been noticed during the excavation. Mention may be made of iron slags which indicate smelting and forging of iron ores, though its direct evidence could not be traced. Brick kiln was an important finding of this excavation. Besides other objects, stone and bone materials including several unfinished items and raw materials as well as tools and implements used by the artisans of the times were also unearthed.

It is significant that the site is situated in an alluvial zone away from the rocky area. One may visualize an interactive mechanism that must have been devised by the inhabitants of the NBPW using people. As pointed above, there must have been a contact sphere between Anai and Agiabir. The latter had yielded a bead-making factory in Pre-NBPW level. The site of Anai must have been a second order satellite settlement of Agiabir-Varanasi complex during its heydays.

A fire appears to have broken out during the mid-NBPW period. A thick burnt layer is universally found in all the trenches at the same level. After this period, Late NBPW pottery appears for quite some time. However, the main mound was deserted before the Kushana period. Incidentally, it is to be noted that there are Kushana settlements just about 2 km away from Anai, perhaps indicating a migration of the people to that area. Similarly, a large number of Kushana settlements have been noticed on the banks of the river Varuna. As mentioned above, for several centuries, the mound of Anai remained unoccupied only to be reoccupied in the Early Medieval period.

The excavation at Anai, though restricted to a one-year archaeological investigation, could throw a welcome light on various aspects of social, economic, religious and

cultural life of the people of the middle Ganga plain between c. 1000 BC and c. 1000 AD. More importantly, the excavation could salvage evidence of our heritage before it vanished due to the population pressure on the land of Ganga and its tributaries.

Acknowledgement

The Director of Anai excavation is grateful to Drs. R.N. Singh and A.K. Singh, and Sri S.K. Yadav of Department of AIHC and Archaeology, Banaras Hindu University, who participated in the excavation. The authors are thankful to S/Sri A.K. Pandey, Rambadan, Shiva Kumar and Barun Kumar Sinha for drawing and photography.

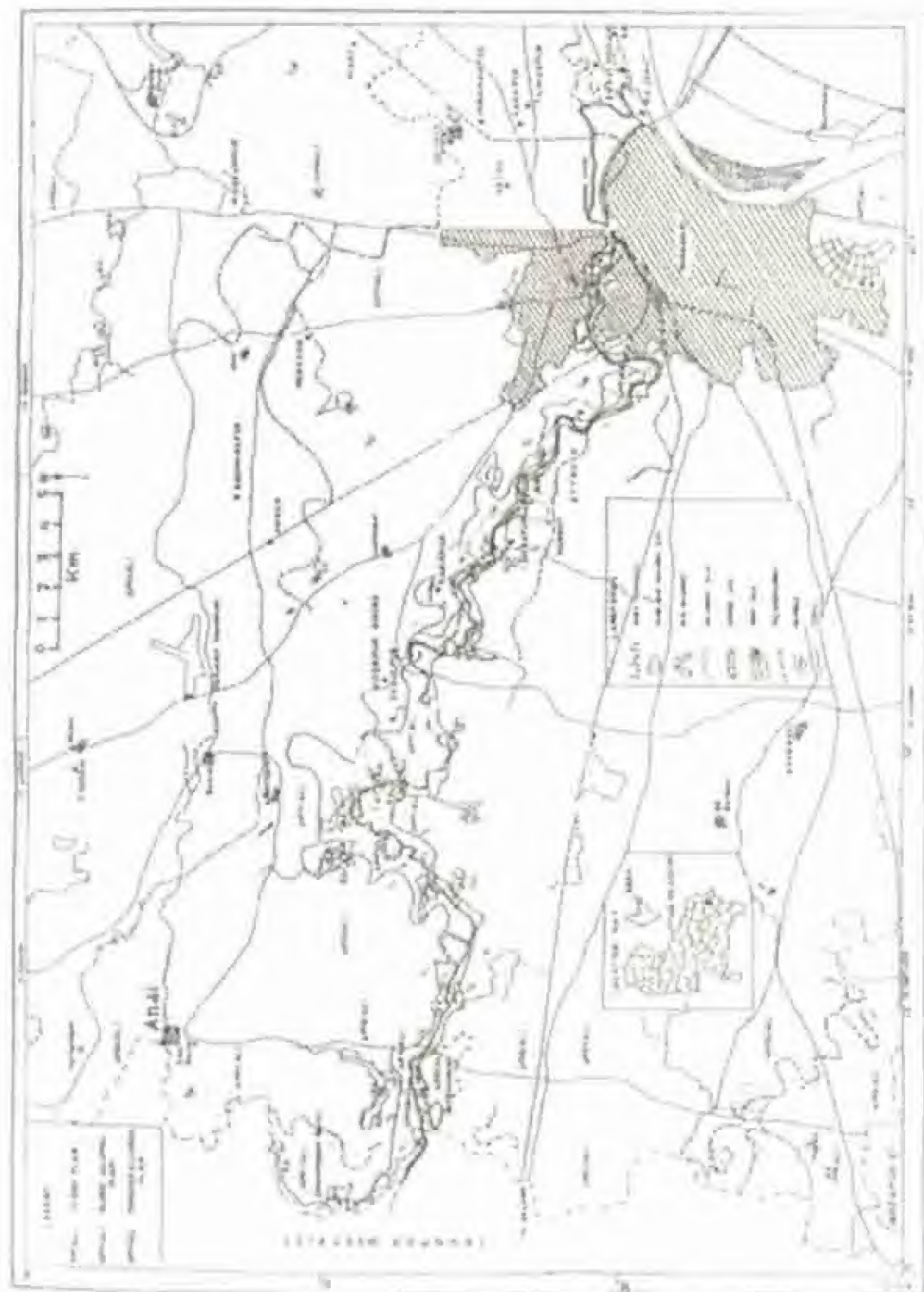


Fig. 1. Hydrogeomorphological map of river Varuna

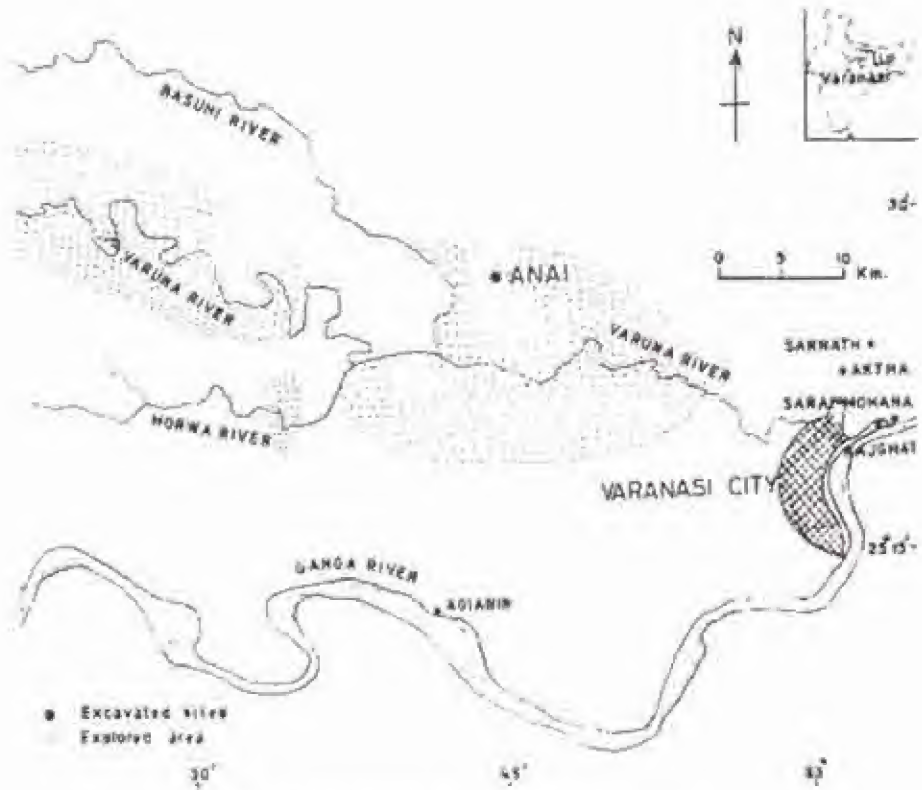


Fig. 2. Distribution of sites in the Varuna region



Fig. 3. Contour plan of Anai mound

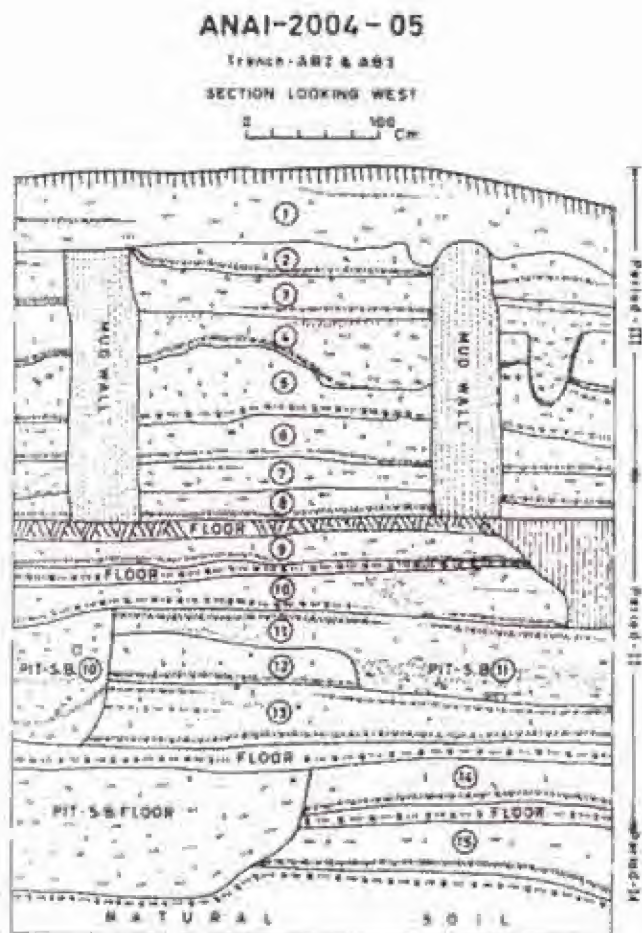


Fig. 4. Section looking west (Trenches AB2 & AB 3).

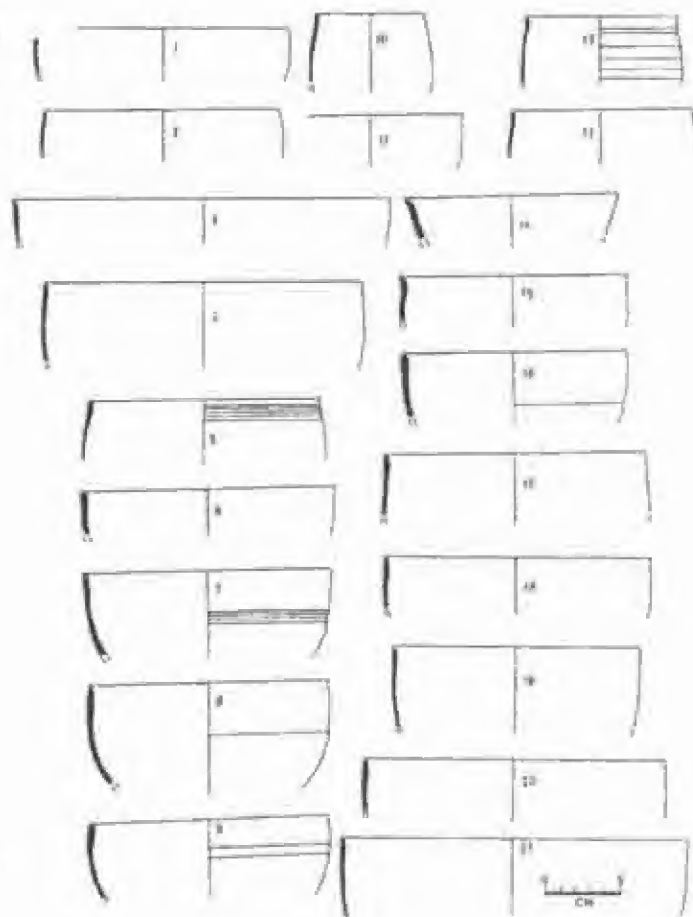


Fig. 5: Bowls of Black Slipped Ware—Period I.

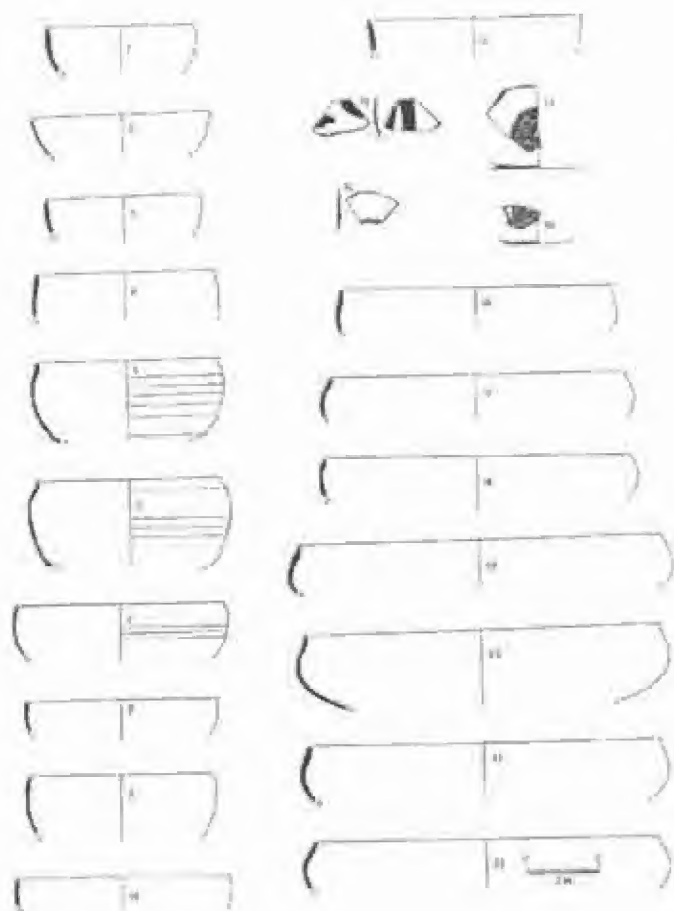


Fig. 6. Bowls and dishes of NBPW - Period II.

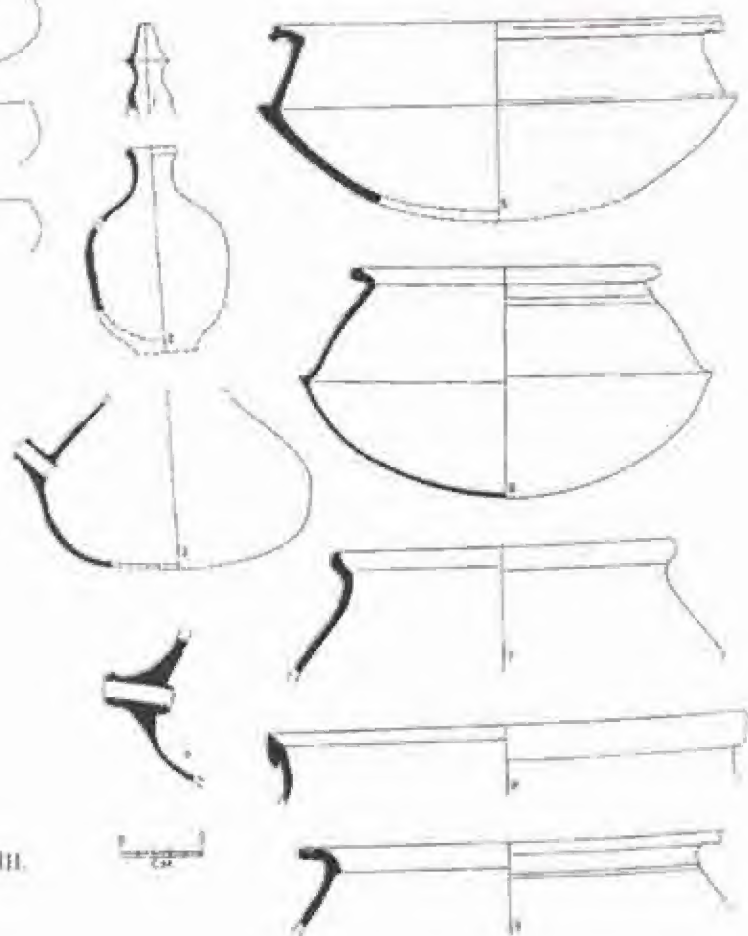


Fig. 7. Red Ware - Period III.

Excavation at Kopia 2006: A Preliminary Report

A.K. KANUNGO*

Kopia (26° 52' N; 83° 4' 45" E), a large village, is located on the Khalilabad-Bakhira road about 12 km north of Khalilabad in the Tehsil of the same name in Sant Kabir Nagar District, Uttar Pradesh. The fortified and moat surrounded archaeological site of Kopia, is located on the western fringe of the village. First two seasons' excavations were conducted in March-April 2004 and March-May 2005 and preliminary reports of these were published in the two preceding issues of this journal. The third season's excavation was conducted during March-April 2006, a preliminary report about its findings, mostly confined to industrial area, is given below.

In the first two seasons, excavation was carried out both inside and outside (northern) the fortification of the mound. Locality I which is at the centre of the mound revealed habitational area with many structures. Locality II, which was outside the fortification and was towards the northern end of the mound, yielded a vast quantity of chunks of glass, crucible pieces and other evidences relating to production and working of glass, and thus suggesting them to be representing industrial areas. Due to limited excavations in the last two seasons in locality II, we could not establish any relation between these localities, i.e., between glass making area and the inner-

fortification area. Thus, this year it was decided to concentrate on locality II. The aim of this year's excavation was to tap the glass making and working furnace, and glass workers' habitational deposit and see how far this industrial area was related to inner fortification area.

Excavated Area

Thirteen trenches, either full or quadrants thereof [OE1, LX24 (NW), LX25 (NW & NE), LX26 (NE), AABX5 (SW & SE), AACX3, AACX4, AACX5 (SW & SE), AADX4, AADX5 (SW & SE), AVX32, AWX31 (SW) and AWX32], covering an area of 218.75 sq. m. were selected for digging. Of these OE1 lie in the centre of the mound; LX24, LX25 and LX26 were on the western boundary of the fortification; AABX5, AACX3, AACX4, AACX5, AADX4 and AADX5 were on surviving north slope of the mound; and AWX31, AWX32, and AVX32 were on a small surviving north-west slope of the mound. Central part of the mound was selected for seeing the extension of structural complex of preceding season, and further information about the habitation of the mound; another aim was to see the time period of fortification and its construction style; northern slope was excavated to understand the habitation area of working class people and

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crafts specialization; and north-western slope was excavated to tap glass making area. OE1 which was 1.50 m down (from the datum), LX24 which was 1.30 m down; LX25 1.27 m down; and LX26 3.23 m down, were all located in locality I; OE1 was dug down to 4.03 m (from the datum) and LX25 to 3.23 m; AABX5 to 7.55 m; AACX3 to 8.03 m; AACX4 to 7.34 m; AACX5 to 7.34 m; AADX4 to 7.79 m; and AADX5 to 7.71 m, were all in locality II, northern slope deposit; and AACX4 was dug down to 9.15 m (from the datum); AWX31 to 7.23 m; AWX32 to 7.23 m, and AVX32 to 7.45 m, were all in locality II, northwest slope deposit; and AVX32 was dug down to 8.29 m down from the datum.1

Stratigraphy

Locality I: The whole area inside the fortification and the fortification are marked as locality I. In this locality, four trenches were dug. In trench OE1, digging was done down to 4.03 m; in LX24 to 2.78 m; in LX25 to 3.08 m; and in LX26 to 5.51 m. In all these trenches cultural finds were of the Sunga-Kushana period.

In OE1 altogether 5 layers were identified, all of them of Sunga-Kushana period. Layer 4 has got a depression which has been designated as layer 4A. This layer has given evidence of a lot of burning activity in the form of ash throughout its length and thickness, and it is rich in cultural material.

Locality II: The area outside the fortification towards north is marked as locality II. This locality is heavily disturbed by cultivation. It is reported that people from surrounding villages take away the earth from this locality for making their house floors as this earth is very hard. However, cultivators have left two patches of deposit intact, at the northwest and northern ends of the mound, respectively.

In the northern end of the mound six trenches were dug. In AABX5, digging was done down to 8.38 m; in AACX5 to 8.44 m; in AADX5 to 8.26 m; in AACX4 to 9.15 m; in AADX4 to 8.24 m, and in AACX3 to 8.41 m. In AACX4, four layers, all of them belonging to Kushana

period, were identified. Layer 4 cuts into the virgin soil and incorporates the depression of layer 3. A test pit was dug in the centre of the SW quadrant of this trench down to a depth of 10.55 m to find out if there was any underlying cultural deposit, but no such deposit was noticed.

Near the northwestern end of the mound three trenches were dug. In AVX32, digging was done down to 8.29 m; in AWX32 to 8.06 m; and in AWX31 to 8.02 m. In trench AWX31 also four layers, all of them yielding material of the Kushana period, were encountered. The underground water tank of AVX32 and furnace pit of AWX32 cut from layer 4 downward into the virgin soil.

Structures

Locality II, Northern Deposit: (Fig. 1.) Five trenches were dug in this locality. They yielded substantial evidence of structures of the Kushana period. Excavation revealed remains of walls of regular structures but not with the quality of finish seen in the structures exposed in the last season in locality I. The structures are of poor quality and in later part they were made with fallen and broken bricks of the earlier period, indicating economic decline of the settlement.

In 2004 season, AACX4 trench was left after exposing a single course brick platform at a depth of 8.28 m and AACX5 with some minor structures. Locality II yielded ample structural evidence to indicate that it was associated with glass making/working. All the structures were made of burnt bricks of the size of 38/37/36 x 23/22 x 6/5 cm or brickbats of various sizes. This brick size is typical of the Kushana period.

Sometimes it is impossible to differentiate between physical layers because of intensive structural activity and objects embedded in section. However, it is possible to identify different structural levels on the basis of different levels on which structures were built and their construction style. This also helps in the identification of stratigraphic levels. Structures excavated in this area can broadly be assigned to two structural levels. However, in each

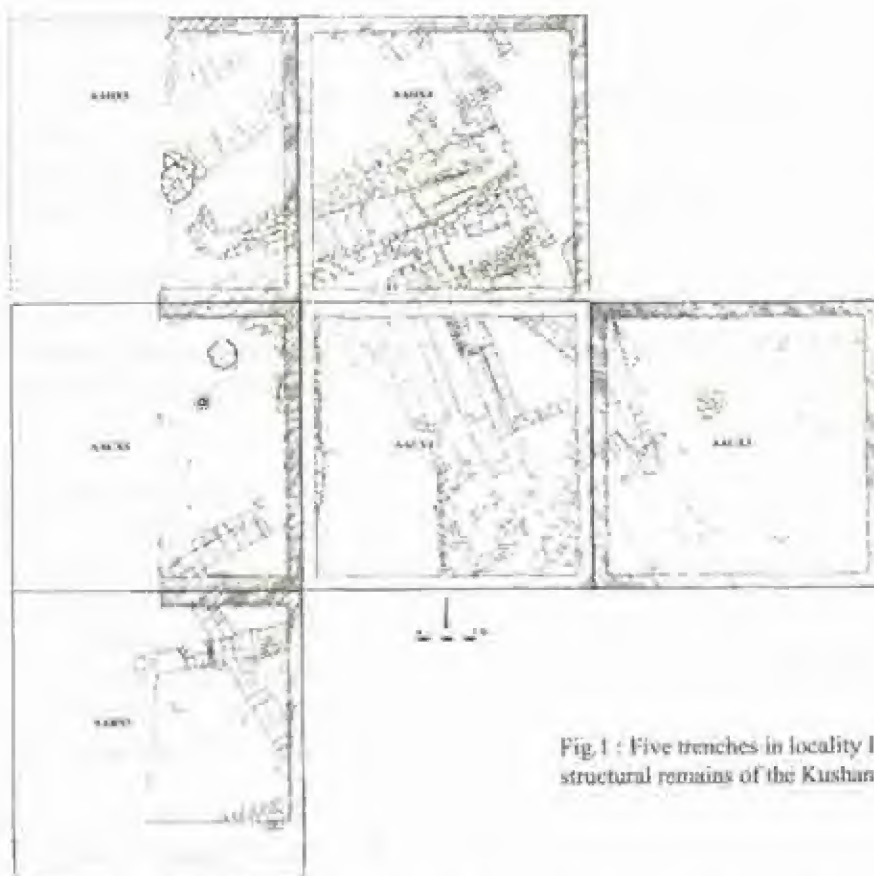


Fig. 1 : Five trenches in locality II (Northern deposit) showing structural remains of the Kushana Period.

structural level there are sub-phases. The lower structural level has two sub-structural phases and upper structural level has three sub-structural phases. The construction method followed in lower structural levels shows typical header and stretcher pattern. Structures in the upper level and its sub-phases are made of rubble and brickbats. Bricks are joined together with clay mortar.

Trench AACX4

This trench is almost in the centre of this part of the mound where maximum habitation deposit is preserved. The upper roughly 30 cm deposit is disturbed due to piling of bricks from nearby cultivated area. The structural remains start immediately below the disturbed area. The stratigraphy of the trench, which is not very distinct at least down to 1 m, consists of bricks and brickbats embedded in clay almost all through the 1 m section.

Structural Phase I, Sub-phase I: This is the earliest structural phase of this area. The beginning of the structural level is exactly at a depth of 90 cm from northern section and is represented by several structures, which appear to be domestic in nature.

In the NE quadrant a northwest oriented rectangular structure is exposed at a depth of 8.12 m. This is made of vertically placed single line of bricks, and has survived to a height of three courses of bricks. Size of bricks is 36 x 22 x 5 cm. The southeast-northwest running wall survives up to a length of 1.70 m and southwest-northeast running wall up to a length of 1 m. The southwest-northeast wall ends in baulk 2 whereas southeast-northwest wall extends into trench AADX4. The total length of this wall is 4.45 m. In AADX4, this wall turns towards northeast in a rectangular shape. A single brick course floor might have been made as a working floor for the above structure. The

size of the bricks used in the floor is 38 x 22 x 5 cm. This rectangular floor extends to AADX5 and AACX3 surrounding the above-mentioned rectangular structure.

Sub-phase II: There is a small structure made of 35 x 23 x 5 cm size bricks at a depth of 7.97 m in the northwest quadrant. The other ends of this structure are in north and east baulks. The structure survives up to a length of 1.38 m in northwest-southeast orientation from the northern baulk and up to a height of four courses of bricks. It is 80 cm long adjacent to west baulk. From the east baulk it is 100 cm long towards west adjacent to north baulk. The foundation (7.5 cm) of this structure is made of clay mixed with potsherds on the brick floor.

Structural Phase II, Sub-phase III: In this trench a small northwest oriented wall, starting at a depth of 7.89 m, is exposed. This wall is above the floor and is rectangular in shape. Its surviving height and width are 23 and 40 cm, respectively. The foundation of the wall is made of clay mixed with brickbats and potsherds. This wall survives up to a length of 63 cm from the north baulk towards southeast, and on the northern side it extends into trench AADX4.

Trench AADX4

Structural Phase I, Sub-phase I: The brick floor of AACX4 extends into this trench and survives up to a length of 2.40 m towards north from south baulk and 3.10 m towards east from west baulk. The later occupants had completely disturbed the periphery of the floor. There are two postholes in the centre of the floor. The first one is placed at 95 cm from south baulk and 80 cm from west baulk, and the second one is at 1.24 m from south baulk and 1.26 m from west baulk. Diameters of postholes are 12 cm each.

The rectangular structure of this floor turns towards northwest and the total length of the structure from south baulk is 1.83 m, then it turns towards northeast and is visible up to a length of 81 cm. The other end of this structure is covered with later structures. In continuation of the rectangular structural level adjoining the northwest corner

of the floor there is a wall of single line bricks of the size of 35 x 22 x 5 cm and it is visible with a gap of 48 cm towards north from the rectangular structure and survives up to a length of 80 cm and a height of four brick courses. In association with this wall two more small walls have survived, both of them emanate from the north baulk. One of them runs from southwest to northeast, and is placed at a distance of 1.07 m from west baulk and survives up to a length of 88 cm. The second one is oriented southeast-northwest, is placed at a distance of 92 cm from west baulk, and survives up to a length of 34 cm. In both cases the other ends are inside the north baulk.

There is one more single-lined vertically placed brick wall oriented northeast-southwest. This wall starts at a distance of 66 cm from west section and 1.25 m from south section and continues into trench AADX5. Probably it extended much further but the deposit ahead is fully disturbed; thus we are unable to know the total original length of the wall. The surviving length of the wall is 3.88 m, height is three courses of bricks, of the size of 35 x 22 x 5 cm.

Structural Phase II, Sub-phase I: There are two small southeast to northwest running walls of this sub phase. Length of the first wall is 1.28 m and width is 34 cm. This wall is placed 71 cm from south baulk and 46 cm from east baulk in its southeast end. The second wall is made of very small size brickbats. The southeast end of this wall is placed at a distance of 92 cm from north section and 1.50 m from east section. Northeast end of the wall is overlapped by structures of sub-phase II. This wall survives to a length of 66 cm and a width of 29 cm. The extant height of both these walls is of two courses of bricks.

Structural Phase I, Sub-phase II: There are three parallel northeast-southwest oriented walls and two southeast-northwest oriented walls surviving to a height of three courses of bricks. Their foundation is made of clay mixed with potsherds and discarded crucible pieces, the latter being predominant. Interestingly this foundation has even got a few big pieces of glass.

From south, the first wall was placed at a distance of 1.25 m from west baulk and 32 cm from south baulk at its north-west end. This wall survives up to a length of 2.25 m and a width of 43 cm. The second wall emanates from west baulk and was placed at a distance of 5 cm from south baulk. It survives to a length of 3.25 m and a width of 43 cm.

The third wall also emanates from west baulk and is placed 1.09 m from south baulk. It extends into trench AADX5 where it turns towards northwest. It seems to be a part of a rectangular structure. The western end of the wall joins to yet another wall running in northwest orientation. The surviving length of the wall in AADX4 to AADX5 is 5.43 m, and its width is 43 cm. The surviving length of the northwest running wall is 97 cm and width is 50 cm. This wall is placed at a distance of 1.49 m from east baulk and 2.66 m from south baulk at its south-east end.

There is yet another wall which emanates from southeast corner of the trench and extends into trench AACX3. This wall survives to a length of 95 cm in trench AADX4; its width is not visible as most of it is beneath the west baulk. The total length of the wall starting from trench AADX4 to AACX3 is 4.43 m; its width in AACX3 is 33 cm. In AACX3, there is a big storage jar which is placed at a distance of 1.55 m from north baulk and 1.77 m from west baulk.

Structural Phase II, Sub-phase III: This sub-phase consists of three small surviving southeast-northwest oriented walls. All of them survive to a height of double-coursed brickbats / broken bricks. These walls overlap on the structural activities of sub-phase II in a criss-cross pattern; rather it seems right on 90° on sub-phase II.

The first wall emanates from southern baulk and is placed at a distance of 74 cm from east baulk at its southeast end adjoining the southern baulk. Surviving length of the wall is 46 cm and width is 58 cm. The second wall is placed at a distance of 86 cm from south baulk and 2.26 m from east baulk at its southwest end. Surviving length of wall is

50 cm and width is 39 cm. The third wall is placed at a distance of 6 cm from south baulk and 2.69 m from east baulk at its southwest end. Surviving length of the wall is 54 cm and width is 63 cm.

Trench AADX5

The deposit of this trench and AACX5 and AABX5 survives only in SE and NE quadrants as the cultivators had dug out the rest.

Structural Phase I, Sub-phase I: The brick platform of AACX4 and AADX4 extends into this trench and covers most part of NE quadrant. The platform survives to a length of 1.69 m from east baulk and 1.82 m from south baulk at its southwest end. The northern end of this floor is inside the baulk. A vertically placed northeast-southwest oriented single-lined brick wall emanates from west baulk. This wall survives to a height of five courses of bricks. A horizontally placed single brick platform exists at the base of this wall. The floor is part of this wall. Surviving length of the wall from west baulk is 2 m and its width is 22 cm. The size of bricks is 37 x 22 x 6 cm. The southwest end of the wall is 1.72 m from west baulk and 1.90 m from south baulk. A parallel wall surviving up to a length of 1.24 m is present in the north. The second wall survives up to height of two bricks. The southwest end of this second wall is 2.22 m from west baulk and 3.17 m from south baulk. The most prominent feature of this trench is that in between these two walls there is a double layered large conical shape basin with flared sides and flat base, which looks more like a specific purpose container. Fifty cm towards north from south baulk a pit of 50 cm diameter and full of crucible pieces and glass, is exposed. Taking all these evidences into consideration the structure appears to be a house where some industrial activity like glass working or bead making was taking place.

Trench AACX5

Structural Phase I, Sub-phase I: A single-coursed southwest-northeast oriented wall in SW quadrant has survived in this trench. This horizontally placed brick wall

survives up to a length of 1.90 m and a width of 22 cm. Size of the bricks is 36 x 22 x 5 cm. One end of the wall survives till the end of southwest corner, at this end it turns towards southeast and to AABX5 trench indicating part of a regular house. And the other end ends with beginning of an outer wall. This wall survives to a length of one vertically placed brick and height of one course only. It has got another vertically placed wall of two bricks towards its north. To the northern side of both these walls there exists another vertically placed single coursed wall.

Trench AABX5

SE quadrant survives to 1.5 m south-north direction, resulting into a trench with 4 m south-north instead of the normal 5 m.

Structural Phase I, Sub-phase I: At right angles to the wall of AACX5, a wall of same size bricks and width emanates from the northern baulk of AABX5. This horizontally placed wall survives to a length of 2.5 m from north baulk and to a height of one course brick, and merges into the east baulk in SE quadrant. Probably it takes another 90° turn at this point. The other wall of this structure is inside the un-dug trench of AABX4.

Structural Phase I, Sub-phase II: A northeast-southwest oriented wall of brickbats emanates from west baulk in the southwest corner of the trench and merges in the southern section at other end. This wall survives to a length of 1.38 m, a height of four brick courses and a width of 41 cm.

Structural Phase II, Sub-phase III: A northeast-southwest oriented wall of brickbats emanates from east baulk and continues in NE quadrant. Surviving length of the wall is 1.78 m, height is double courses of bricks, and width is 35 cm. The northeast end of the wall at east baulk is placed at a distance of 13 cm from north baulk.

Followings are the points of the top surface of the deposit of different sub-phases from datum (all depths are taken in trench AADX4 except Structural Phase I, Sub-

phase I which is in AACX4).

1. Structural Phase I, Sub-phase I	8.32 m
2. Structural Phase I, Sub-phase II	8.16 m
3. Structural Phase II, Sub-phase I	8.04 m
4. Structural Phase II, Sub-phase II	7.94 m
5. Structural Phase II, Sub-phase III	7.90 m

Locality II, North-western deposit: (Fig.2, Pl.1) In 2005 two trenches, AUX32 and AVX32, were dug, but in no trench was virgin soil reached. But from the material remains recovered, it was clear that this part of the mound was related glass making industry. Trench AUX32 yielded very mixed antiquities and no structural activity of importance, and AVX32 yielded glass pieces in plenty, but without any context. Thus excavation in AVX32 was revived in this season. This is nearly the northwest end of the mound. About 25 m west of the trench there is an old water channel. About 25 m north and 15 m west a cultivator is reported to have found a number of big storage jars in a line adjoining the water channel.

Trench AVX32

This trench is 7.42 m down from datum point. At the depth of 8.11 m in SE quadrant, a floor with a 10 cm thick deposit of glass pieces and crucibles was found. This indicates glass working on a very large scale. There is a small squarish underground water tank right in the centre of the trench. The tank is placed at 1.27 m from south baulk and 1.28 m from west baulk at its southwest end; 95 cm from south and 72 cm from east baulks at its southeast end; 1.13 m from north section and 50 cm from east baulk at northeast end; and 1.23 m from north section and 175 cm from west baulk at its northwest end. The size of bricks used to make this tank is 35 x 22 x 5 cm. The inner side of the tank is step-like in section after first seven courses of bricks from the bottom. The width of the steps varies from 1.5 to 2 cm. The bricks are vertically placed and in single line. There are different numbers of surviving courses of bricks in different section of the tank, 29 courses in south,

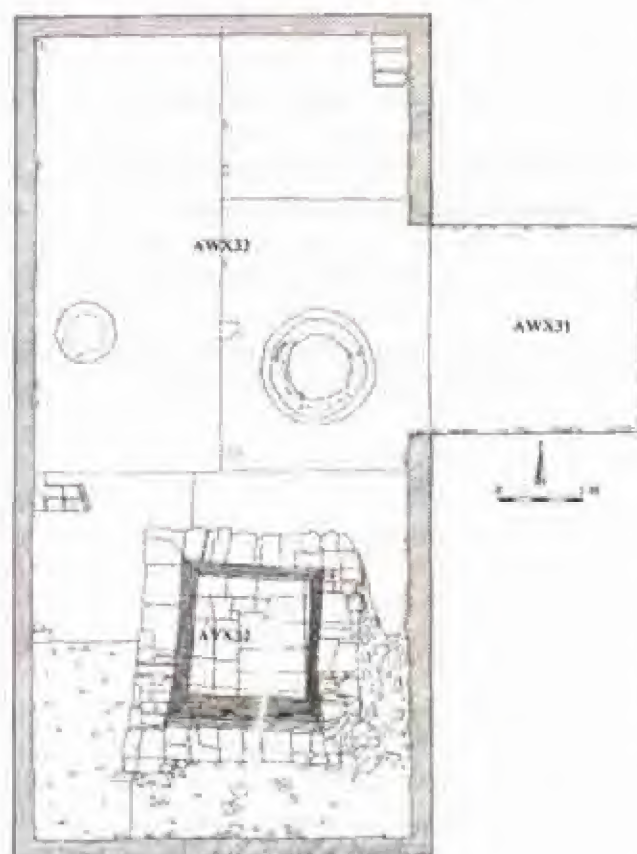


Fig.2 : Five trenches in locality II (North-western deposit) showing structural remains of the glass-working

18 in north, 30 each in east and west side. There are two prominent water channels after 24 courses from bottom on southern side of the tank. The upper portion is disturbed at various levels at all sides and at southern side it appears falling from water channel level. Both the channels are three brick courses high and 17 cm wide. Floor of the tank is made of 35 x 22 x 5 size bricks. The inside size of the tank at floor level is 1.22 m (east to west) x 1.25 m (north to south); at top it is 2.20 m (east to west) x 2.22 m (north to south). The depth of the tank till floor level from datum is 9.42 m. The surviving height of the walls from floor of the tank is 1.53 m on its south, 1.63 m on its west and east and 1.02 m on its north side (PL2).

In NW quadrant there is an east-west facing three

course thick brick wall. Length of the wall is 71 cm from west baulk, and width is 45 cm. The foundation of the wall is made of clay mixed with potsherds. This wall starts at a depth of 8.29 m.

Trench AWX32

Because of the high concentration of glass and crucibles in AXX32 we extended the excavation to AWX32 trench. In SW quadrant of AWX32 at a depth of 7.71 m abundant residues of glassmaking lay on the surface and for about 5 cm below the surface. In the same level in SE quadrant of AWX32 there was a big circular pit. From top one could easily see a number of downward inverted bricks in an ashy context. On exposing the trench in NW and SE quadrants a floor plastered with clay was noticed at a depth of 7.78 m. This floor level seems to be located on virgin soil. In SW quadrant, there is a small pit of 65 cm diameter and 36 cm depth. The content of the pit consisted of brickbats and potsherds. This pit is placed 27 cm from west baulk and 70 cm from south section.

At a depth of 7.68 m a horizontally placed single brick wall emanates from north baulk of NE quadrant and survives to a length of 57 cm. It has a height of four courses of bricks and is placed 11 cm from east baulk. Size of the bricks is 33 x 21 x 6 cm. Foundation of the wall is made of large size single coursed bricks, which rest over a 10 cm thick base of clay mixed with potsherds.

On exposing the large pit in SE quadrant we noticed a number of *in situ* crucible pieces in which glass is melted a number of tuyeres (PL3) along with a large quantity of charcoal. Further excavation of this pit proved it to be a glass furnace. To see the outlet of the furnace and any other contextual evidence we opened the NW quadrant of AWX31 without any baulk, however, we encountered nothing new.

We excavated this quadrant down to 28 cm from the floor level of NW-SW quadrants cutting the virgin soil and leaving the furnace area intact. The upper part of the furnace was probably doom-shaped. Diameter of the

excavated furnace is 1.35 m at its outer periphery, 1.10 m at its inner periphery, and 80 cm at the bottom. Height of the surviving part of furnace is 65 cm (Pl.4).

Locality I: In locality I excavation was conducted at two places: three trenches (LX24, LX 25 and LX 26) were dug on the western wall of the fortification and one trench, OE1 at 25 m south of last season's OB1. It seems that the fortification was built in several stages. In the later stage large size bricks were used whereas the earlier fortification was made of mud. In NE and SE quadrants of OE1, a part of a large rectangular four coursed brick structure was exposed. The height of the structure appeared to be intact and the whole structure looked like the boundary of a monastery. Bricks are of unusually large size, 52 x 30 x 8 cm. We did not reach virgin soil in any of the trenches.

Pottery: The excavation in locality I (OE1) yielded a relatively high quantity of potsherds of different wares. In locality II at the northern slope quantity of pottery is relatively low but size of the pots appears larger and thicker in section, and at northwest slope potsherds are few but crucible fragments and glass pieces are in abundance.

Different ceramic wares were evenly distributed, both horizontally and vertically, in the excavated area in locality I. This season's dig yielded a few rim sherds of crucibles in locality II and they enabled us to reconstruct the shape and size of these objects. The crucibles were made in two layers; on a pot made of vitrified clay an outer layer of clay mixed with straw was applied to resist the temperature.

Like the last season, pottery is uniform throughout the excavated deposit. The wares remain the same though red slipped ware was very less in quantity in locality II and NBP was nil. and, interestingly, micaceous pottery was scarce. As per the shape the percentage of jar and basin is much higher in comparison to last season. Some of the best specimens of nearly intact pots of very fine quality red ware were unearthed in locality II.

Material Culture: Non-ceramic items consist of terracotta figurines, metal objects, beads, bangles and miscellaneous

pieces.

Terracotta Figurines: Twenty-nine terracotta figurines were recovered and many more were collected from the surface and from villagers. Almost all belong to the Sunga-Kushana period. Most of them are fragmentary, broken at the joint, in the case of human figurines, at the junction of the head and the body (Pl.5). It is same with bigger size animal figurines but smaller size are found comparatively intact and made in one mould. They are characterized by coarse modelling, and having large goblin-like bulging eyes. The head seems to have been mould made while the body is handmade, and both are then joined together. A good number of heads are found. A beautiful female face was found on fortification.

Metal Objects: Seventeen iron pieces, most of them nails, and many slag pieces were found in the excavation.

Of the six copper pieces, five are coins, and one is a point. And the most spectacular find was that of a wristlet and bracelet joined together due to corrosion (Pl.6). A villager found it, while digging the land for a canal, just adjacent to our northern slope excavation in our presence.

Beads: All together 15 terracotta beads, 17 glass beads, one glass pendant, nine glass rods, four glass tubes, one glass bead segment, and four stone beads were recovered from the excavation. Of the fifteen terracotta beads, four are arecanut in shape and a few are melon shaped. There are a number of terracotta balls/ sling balls.

Out of 15 glass beads, the collar shaped and drawn Indo-Pacific beads dominate the shape (Pl.7). Along with the beads there were nine glass rods and four tubes, all of them produced in drawn technique. This indicates the possibility of the existence of an Indo-Pacific bead industry here. A few colouring agents of glass are also found as they are used in present day Papanaidupet. Glass beads are of blue, black, orange, green and golden yellow colours. Of the four stone beads, two are carnelian, one is quartz and another is made of agate.

Bangles: Of the 26 bangle pieces, 19 are made of glass and rest are of terracotta with generally roundish and exceptionally flattish rectangular in section.

Other Antiquities: Some of the other important antiquities found at the site comprised a number of votive lamps, seal terracotta pestles and wheels, ear studs, miniature pots, rattle heads (Pl.8) pestles, and bone points.

Glass: Glass was found in abundance in locality II. However, northwest slope mound seems to have been specifically associated with glass making and working because of the finding of hundreds of glass chunks and debris of glass production besides a furnace pit next to a water tank. In the northern end trenches there appears to be a house of a glass bead maker.

Remarks

The finds in the habitation area at the northern end include a number of glass beads and bangles along with bead polisher and some basins and storage jars of very typical shape which makes us believe that the people related to the glass bead/bangle making lived here. The structural remains are not as rich and impressive as those of locality I of the last season as the occupants would have been working class. There appears to be a gap between structural phases I and II. The phase II structures are made of broken bricks of phase I. This situation indicates economic decline and probably the last phase habitation of the site. A number of big storage bins indicate water and food scarcity implying environmental change by that time.¹ Crafts makers might have used some of these big pots.

The glass production furnaces were located on the northwest slope of the mound. Neither any utilitarian cultural remains were found from excavation at this place, nor is any habitation deposit noticed in the surrounding area.

Acknowledgements

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Notes

- 1 All depths are given from the northwest peg.
- 2 Every trench at the site is of the size of 5 x 5 m, and is separated from adjacent trenches on all sides by a baulk of 25 cm width.
- 3 It is important to mention here that the river Arni, which is flowing 2 km away from the site, was flowing just next to it when it was occupied.

The Copper Hoard Culture of the Indo-Gangetic Plains – A Mystery Unravelling

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The culture, which is distinctively characterized by the presence of copper objects such as anthropomorphs, harpoons and antennae-hilted swords and associated tool types like hooked spear-heads, double-edged axes, flat axes with convex cutting edges, shouldered axes, hatchets, bar celts, etc., is known as the Copper Hoard Culture. The Copper Hoards are mainly found in the Indo-Gangetic plains, although some solitary antennae swords have been reported even from south India.

Referring to the traditional coppersmiths called the *Tamias* in the Kumaun Himalayas, some scholars feel that the ancestors of the *Tamias* may be the authors of the Copper Hoards in Kumaun and in the Doab (Agrawal & Kharakwal 2003:210). Heine-Geldern (1936:87) identified the Copper Hoards with the Aryan migration into India. S. Piggot (1950:238), on the contrary, attributed them to the Harappan refugees. S.P. Gupta (1963:147) suggested an indigenous origin of the Copper Hoards. According to Y.D. Sharma, "...[the Copper Hoards] were being supplied to the straggling Harappan people and others by local craftsmen" (Sharma 1965:134; 1971-72:42). H.D. Sankalia (1974:47) like Lal (1951:20-39) felt that the Copper Hoard people were probably connected with the

Ochre Coloured Pottery (OCP) people. Thus, various views expressed by these scholars demonstrated the intricacies related to the identification of the Copper Hoards in their original historical context.

Copper Anthropomorphs

The most idiosyncratic and inscrutable entities in the Copper Hoard repertoire is the type called 'anthropomorphic figure' or 'anthropomorph' (Plate 1). These flat, human-like figures were cast into moulds and are invariably provided with speckled marks on the head, torso, incurved arms sharpened externally, but with thick heavy and blunted heads, and splayed-out or fused legs. They are very heavy and massive, with their length varying from 20 to 45 cm and the width from 20 to 45 cm, and their average weight is 5 kg. Curiously enough, these anthropomorphs have been variously depicted as hurling missiles (Agrawal 1971:200), weapons of the throwing knife type (Gordon 1958:137), ritual figures (Allchin 1968:204), *vajra* (thunderbolt) of Indra (Das Gupta quoted in Falk 1993:195 & Krishna Kumar 1990:97-100) and, even a symbol of good omen (Sharma 2002:182).

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It is worthwhile to note the contexts of some of the major copper findings from the north-western India, Central Himalayan region and the Ganga-Yamuna doab (Fig. 1). Sharma *et al.* (2001-2002:34; *JAR* 1999-2000:233-5) report a hoard of 31 copper anthropomorphic figures placed one above other *in situ* from Madarpur in western Uttar Pradesh. In 1989, a hoard of eight copper anthropomorphs was discovered at Bankot in Pithoragarh District of Kumaun in Uttaranchal State (Joshi 1995-96:23-31). They were placed one over other in a tray-like stone slab (*JAR* 1988-89:87-88). Another hoard of five anthropomorphs was discovered from an earthen jar buried in the ground at Khuna Tok in Naini-Patal village of Pithoragarh District (Agrawal and Kharakwal 2003:200; *JAR* 1999-2000:195). Recent excavations at Sanauli, a burial site, in Uttar Pradesh have yielded a *sui generis* specimen in the form of a tiny gold anthropomorph of about 2.5 cm in height. It has typical distorted arms and splayed out legs. (Sharma, 2006). It may have been used as a talisman or a pendant since the specimen has a tiny piercing on it to be attached to a string. Although the Sanauli anthropomorph differs from all the rest, yet the site has yielded a number of copper antianae swords. All these indicate a devoted and careful human intervention behind these curious objects.

Identification of the Anthropomorphs

The most important aspect of the anthropomorphs is that they are generally found in groups and all have uniform physical attributes. It is important in this case to note that in ancient Indian mythology only one group of deities may be represented with uniform physical features, precisely, they are the Vedic *Maruts*.

Strictly speaking, the appearance of the anthropomorphic figures as the unique personification of a group of deities is, however, noteworthy. Such an idea must have been adopted from the contemporary Vedic concept of God. Macdonell (2000:15) aptly remarks: "Indefiniteness of outline and lack of individuality characterize the Vedic conception of the gods". It may be

a reason that no other Copper-Bronze Age Culture of the world has produced such a unique type of figures as the Copper Hoard anthropomorphs.

The *Maruts* are generally interpreted as the 'atmospheric gods' of the Vedic period. They were referred to as *Marutam ganah* (band of the Maruts), always in plural. The Vedas also mention *Marutana* (RV. i.23.8; v.81.13; AV. iv.15.4), *Marutenah ganam* (RV. v.32.2), *Marutam ganam* (RV. v.52.13&14; YV. xviii.45; AV. iv.13.4), *ganam Marutam* (RV. v.53.10 & v.58.1) and *Prutam Marutam* (RV. iii.26.6). Their number is thrice-sixty (RV. viii.85.8) or thrice-seven (RV. i.133.6; AV. Xii.1.13) or seven times seven aggregated as a single troop (RV. v.52.17). Sayana mentions the birth of forty-nine *Maruts* in seven troops. The *Satapata Brahmana* (II. 5.1.13) refers to seven-seven (forty-nine) *Maruts* whereas in the *Jaimini Brahmana* forty *Maruts* are mentioned. All these descriptions mention that the *Maruts* have been found in groups; similar is the case with the Copper Hoard anthropomorphs.

The RV gives a vivid description of their origin. Since the *Maruts* were born out of Rudra (i.39.4) and Prsni (ii.34.2; v.52.16; v.60.5; vi. 66.3), they are brothers and among them none is eldest (*ajyeshtha*) or youngest (*akanishtha*) (RV. v.59.6 & 60.5). They are also equal in age (RV. i.165.1). They are otherwise known as 'Rudras' or 'Rudriyas' (sons of Rudra) (RV. v.57.7), 'prsrne putra' (sons of Prsni) (RV. v.58.5) and 'Prsnimatarah' (having Prsni for their mother) (RV. v.57.3 & 59.6). They grow up together (RV. v.60.5; vii.58.1), of the same age (RV. i.165.1) and are of one mind (RV. viii.20.1&21). They have the same birthplace (RV. v.53.3) and are *santlrah*, i.e., the dwellers in one abode (RV. i.165.1; vii.56.1). Among the *Maruts* no one is inferior to the rest, but equal in measure as days, and all are identical in their physique (RV. v.58.5). All these characteristic *lakshanas* (traits) of the Vedic *Maruts* are apparently inherent with the Copper Hoard anthropomorphs.

The *Yajur Veda* (YV. xxiv.4) clearly mentions

'*prsmistraschina prsmirurdhva prsmiste Marutah*' which means 'speckled, transversely speckled, upward speckled entities belong to the *Maruts*'. Such small irregular marks called 'hammer/chisel marks' are invariably found on the copper anthropomorphic figures. The YV further clarifies 'the speckled entities' (*kalmashah marutah* – xxiv.7; *prsnayo marutah* – xxiv.14) possess the qualities of the *Maruts*. What is more, the YV (xxiv.15) ultimately reveals '*prsnayo Marutah kayastuparah*', i.e., 'the speckled *Maruts* resemble man in nature'. All these descriptions fit in the anthropomorphs of the Copper Hoard repertoire.

The *Maruts* as the Authors of the Copper Hoards

It would be worthwhile to note that the Rig Veda extols the *Maruts* as '*Sindhumatarah*' and '*Prsnimatarah*'. Scholars have translated '*Sindhumatarah*' as 'the sons of the Ocean' and '*Prsnimatarah*' as 'the children of the earth, cloud, milk or cow. On the contrary, the very term '*Sindhumatarah*' denotes 'the sons of the Indus' and '*Prsnimatarah*' stands for 'the sons of the Parusini (Ravi)'. Thus, the *Maruts* were the original inhabitants of the Indus-Ravi basin who might have had some deep-rooted relations—either genetical or cultural—with the Harappans of the region. In support of this view, Sharma (2002) also says that the Copper Hoard implements of western group show generic relationship with the Harappan tool repertoire. At this juncture, it is relevant to note an important Rig Vedic hymn (v.59.3): '*gavam iva srjyase sringam uttaman suryo na cakshu rajaso visarjane*' ('You wear, [O, *Maruts*], an outstanding head-gear like the horn of cattle. And, like the sun, you dispel darkness'). Such horned head-gear is well depicted in the Harappan art. In addition, the horned-headgear seems to be a symbol of power and authority both for the Harappans and the Vedic people, since the Vedas themselves have been described as the "horned ones". Hence, the Rig Vedic *Maruts*, the authors of the Copper Hoards, seem to be the descendants, genetically, or else culturally related with the Harappans. It appears to be the reason that while referring to the *Maruts*, the Rig Veda always prefers to prefix the epithet *saputa*, i.e., 'nobly-horn' (RV. v.53.12), instead of using the

appellation *arya*, which means 'entirely refined and liberal'. Interestingly, according to the *Srimad Bhagavatam* (6.18.20) the forty-nine demoniac *Maruts* were absorbed into the Vedic pantheon and converted into demigods by Indra.

Sum Up

The dichotomy of the Vedic *Maruts* as human beings and demigods (anthropomorphs) is clearly expressed in the Vedic literature. The *Rg Veda* does not describe the *Maruts* as the anthropomorphic entities. On the contrary, they were referred to as *narah sreshthatama* (great human beings) moving unit by unit. It seems that during the Rg Vedic period the anthropomorphic form of the *Maruts* has not been conceptualized. It might be a reason that copper anthropomorphs have not been discovered from the region west of the Yamuna, except a fragmentary piece from Ambala in Haryana. By the time they reached the Ganga-Yamuna doab, which is contemporaneous to the period of the *Yajurveda*, the *Maruts* started worshipping the anthropomorphic figures. It is attested by a large number of anthropomorphs recovered from the Gangetic Divide. Once the bands of the *Maruts* lost their importance in the Vedic society, the cult of the anthropomorphic *Maruts* began to disappear. Since they were incorporated into the Vedic pantheon as demigods, of course, they could survive for sometime. Thus, the anthropomorphic figures were confined to that region where the bands of the *Maruts* once flourished. In conclusion, the copper anthropomorphs stand as the first archaeological materials corroborated by the Vedic literature, which would otherwise help date the Vedic Age scientifically.

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Fig. 1: Distribution of the Anthropomorphic figure findspots of the Gangetic Plain.

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An Archaeological Study along the Damodar-Ajay Interfluve in West Bengal (*Circa AD Ninth to Fifteenth Centuries*)

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The present paper is a brief and preliminary empirical attempt to understand the nature and pattern of spatial distribution of early medieval-medieval archaeological material in the central-southern-southwestern parts of the Bardhaman District.

Scope and Limitations: Reasons behind an Empirical Undertaking

The major issue, highlighted so far in the context of early medieval archaeology of Bengal, has been consistently centering round an "urbanization" paradigm with statements over specificities of settlement structure (Ray 1987, Ray 1999:217-233, Chakrabarti 2001:115-121, Chattopadhyaya 2003:91). In spite of a steadily growing separate genre of literature on early medieval-medieval archaeology (Panja 1998:106-151; 2002:227-278; Rahman 2002:191-226; Gupta 2002:83-100) many facets of this problem are far from being clear. Early medieval pottery, the most commonly and enormously attested artefact in Indian sites, for example, still remains a big question and we are yet to find an index to resolve confusions.

Questions over the empirical validity of identifying

early medieval sites and settlements, in the alluvial tracts of West Bengal and Bangladesh, rise from obvious geographical and geomorphological factors. The general assumption that finding sites and settlements in terms of material culture and habitation, respectively, is a highly frustrating endeavour in the alluvial terrains of West Bengal hold true for many of the riverine tracts of the Delta. The diversity of the geo-morphological character of the present Bardhaman region does not allow us to undertake archaeological surveys in terms of strictly definable regional geographical-geological parameters. Therefore, the present study has aimed at locating archaeological sites' locations of occurrence that provide data in the reconstruction of the cultural milieu of a larger agrarian landmass and present an understandable picture of changing patterns of space organization and man-environment relationship during the time-period specified in the title.

Introducing the Study Area: Physical Settings

The paper is based on a few seasons of explorations and the recent excavation at Mangalkote (by no way excluding visits to many of the already reported sites) in an area geographically falling between 23°25'–23°53' N and

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86°48'–87°32' E roughly, in the District of Bardhaman.

Cultural Identities: Geographical Set-up in Historical Outlines

Around the juncture of what we now conceive as 'early historic' and 'early mediaeval' periods, the more western geographical terrains witnessed movements of people with sectarian practices and socio-political organization alien to the region so far. Growth of local ruling lineages precisely from the second half of the sixth century and introduction of Brahmanical, Buddhist and Jain ideologies led to a gradual shift in the social structure. Our available archaeological sources, as we shall see below, tend also to show this mechanism of symbiosis.

The earliest epigraphic evidence on early mediaeval village settlements in this area comes from the alluvial tracts of the Damodar flood Plains from the village of Malla Sarul, in the form of a copper Plate inscription of the time of Gopācandra, around the later half of the sixth century (Majumdar 1940:155–161, Sircar 1965:372–377, Majumdar 1971:52). Available archaeological evidence from this region also tends to attest the growth of rural settlements in this territory in the early mediaeval period. It is quite interesting to note that Varddhamana as a *bhukti* or 'province' level administrative centre had already emerged by that time, according to the same source. Although we have very little evidence on the political structure of the region during the time of the Pala rule in Bengal, the recent discovery of the Mandalgram image inscription from the northeastern part of present Bardhaman shows continuation of BRW-using rural settlements till the time of the Pala ruler Nayapala in the mid-eleventh century. The evidence also vindicates the process of royal legitimation over rural, unorthodox, cult rites. With the establishment of the Sena political supremacy over much of the Delta, at least in the eastern segments of present Bardhaman, continued to witness the programme of agrarian expansion. Direct testimony to this fact is borne out by the Naihati copper Plate inscription of Lakṣmanasena that records the creation of larger *agrahara* settlements in the eastern-northeastern parts of this territory

(Majumdar 1929:68–80). Equally interestingly, the region retained its territorial identity as a *bhukti* level settlement till the late twelfth-early thirteenth centuries, when two separate administrative provinces were created by "parcelling out" Uttara Radha from the Varddhamana *bhukti* (Gupta 1996:573).

For many of such princely localities our knowledge rests completely, so far, on early mediaeval-mediaeval narrative accounts like the *Ramacaritam* or the *Mangala Kavya* texts (Basak 1969:36, Sanyal 1984:205–215). For some others, on the other hand, we have enough epigraphic and archaeological data, which might speak of a steady process of genesis, yet to be underlined in a complete contour, of state from "principality" (for one of the well-referred attempt, see Sanyal 1987:73–142), within a loosely defined geo-political orbit. Two of the many such *bhuma* countries (viz. *sikhara bhuma* and *Gopa bhuma*) formed, partially, parts of the present study area and it has been suggested aptly on the basis of literary sources that "state formation process was in progress in this area" (Gupta 2002:87) in the period between the twelfth and the fourteenth-fifteenth centuries.

Sampling Strategy: Survey of Archaeological Settlements

Nature of resource-base on early mediaeval-mediaeval archaeology of Bengal, in spite of appreciable attempts, have to be tested in the light of the pattern of distribution of sculptural material, brick-size and sometimes recognizable pottery types for the mediaeval period only (see Ray 1999:217–233), particularly in the absence of satisfactory evidence on early mediaeval pottery types.

Architectural remains include only three temple complexes/temples remaining intact and some dilapidated temple-runs in the form of basements and plinths, parts of architectural members (stray and all abandoned) and a lone example of Buddhist stupa. Here we may note that structural evidence is predominantly religious in character. We have hardly any evidence in respect of the development of secular building complexes: though there are a few ruins

of fortifications, rampart walls and settlement areas having ring-wells at Aima, Syamarupargari, Tilokchandrapur areas under the jurisdiction of Kanksa Police Station and Churulia and Punchra near Asansol. But these undetermined complexes are more confused in terms of chronology and nature.

Considered from the point of view of sculptural history, it is not desirable to describe the art tradition of any period under a particular religious appellation, though religious art no doubt has always been behind the full efflorescence of the art style that has emerged in this region under local patronage. But the difference lies only in iconographic context and, above all, the images are the sole evidence of the sculptural art of this period. Compared to the abundant Buddhist, Jain and Brahmanical images from the neighbouring areas of the Gangetic Plain towards east and Chhotanagpur towards south and west, rareness of such images is strikingly noticeable.

Among the enshrined Sivalingas, the specimen of Arrah (140 x 110 x 110 cm) temple deserves special mention. The Nandin or bull lying in the Barakar temple complex belongs to Saiva sectarian faith. The classic specimen of Nataraja (75 x 40 cm) made of grey sandstone, dancing on a bull with eight hands from Arrah possibly dates to the seventh-eighth century. Besides the sculpture of Vishnu Lokeshvara from Garui, now in the Indian Museum collection, there are three other Vishnu images recorded from the site of Sasthitala and Sivasthan at Punchra. Among these, two specimens are identified as Vishnu Lokeshvara, the third being of the *sthanaka* variety. The local chlorite/sericist variety of stones has been possibly used for these sculptures. The Vishnu Lokeshvara images (100 x 75 x 10 cm; 83 x 45 x 4 cm) are lying in abraded form, whereas other Vishnu images in *sthanaka* posture (77 x 48 x 12 cm) are also noticeable in damaged state of condition. The images of Ganesa (135 x 90 cm) from Barakar, Surya (110 x 60 cm) from Birbhanpur and a few others broken unidentified male and female images from Punchra are the other noted examples.

The general ceramic assemblage explored in the

southwestern parts of the study area including Gaurangapur, Syamarupargari and sites in and around the Kanksa is characterized by mainly the presence of plain red ware, red slipped ware, typical red ware with application of slip in the interior and an external buff surface, medium to fine grey ware and the typical black ware having a black slip in the interior with an exterior showing sturdy black colour.

Specimens of red ware are medium to coarse in texture, ill-fired and wheel-made, reflecting the typical medieval-late medieval industry with predominance of large-sized pots (*ghata*) having banded design, used for storage or offering purposes. Most of the typical black ware sherds collected during our exploration were body sherds in fragmented state, thereby showing a greater frequency of breakage and recycling. These specimens are, however, generally thin textured, well fired with thin fabric and in most of the cases the cortex shows enormous mica intrusion. It is not possible, at the present state of our information, to comment on the shapes because of the surprisingly complete absence of rim sherds.

Ceramics from the Mangalkote and Durgapur blocks are characterized with black ware, grey slipped ware, typical black ware and coarser varieties of red ware with a few banded specimens. Apart from pots, shallow-necked jars/vases and large bowls, spouted bottlenecked vessels (Pl. 1) predominate at almost all the sites (for general pottery types, see Figure 2). Instead of locating sites in terms of their "eastern" or "western" situations, we have attempted to summarize the archaeological database in terms of modern settlement landmarks. Thus, five blocks like the Mangalkote, Durgapur, Raniganj, Asansol and Barakar—in an east-west direction—have been discussed separately (Figure 3). Sites and settlements attested at different settlements blocks are described with their archaeological coordinates in what follows.

The Mangalkote Block

Mangalkote (MGK): Besides previous excavation reports, the present season's (2005-2006) excavation at the mound of Kolubardanga by the Department of Archaeology,

University of Calcutta, has revealed a cultural sequence roughly datable to early-medieval-medieval phases. Besides large number of pottery and other minor antiquities of medieval period, special mention should be made of a terracotta human head *in situ* (Pl. II) from Layer III that constitutes part of a four-layer sequence.

From the available materials attested at ZA1, one of the two trenches dug down to a depth of 1.75 m it appears that the medieval-late medieval settlers, who inhabited the peripheral zones of the village of MGK, occupied this area. The walls of the building were, at best, reduced to their brick foundation and had often been robbed out. The patches of floor associated with them were also in a very bad state of preservation. Materials in the southern portion of the trench had almost been entirely destroyed (Pl. II) due to the regular brick hunting in the recent periods. Most importantly, a line of bricks laid in clay mortar was attested at ZA1. A patch of floor has also been detected. It appears from a close observation of the east-southeast sections that regular onrush of floodwater has devastated the structural complex. After the removal of a silt layer, another flooring layer (Pl. III), made of rammed mud mixed with coarse sand, broken potsherds and brickbats was reached.

Since the general stratigraphic sequence attested was based on evidences from two small trenches, they are tentative and open to further revision. The stratigraphy shows that a thick deposit of alluvial silt, constituting the top surface, caps the entire excavated area. Visible elements on the sections such as carbonized material, ashy substances, charred bones, charcoal and burnt earth divide the entire sequence into 4 distinct pedological layers. Layer I in the northern section appears to be more substantial than on its southern counterpart. The layer is characterized by the random occurrence of ash and carbonized particles. Distinct traces of thorough burning occur at both the Layers II and I. Layer II, which starts with traces of burning in the northern section, continues to a mud floor level containing occasional distribution of potsherds. A small patch of mud plaster lining is also preserved in the section partially. Layers III and IV are highly disturbed and may well be

eventually combined with their preceding counterparts. The base of Layer IV shows hard clay patches, covered by ash deposits in points. On the top portion a series of surfaces can be traceable on one of which sits a plain hearth. However, the Layer IV is characterized throughout with abundant quality of carbonized faunal and floral materials. One isolated sherd of BRW was found from the lower levels of Layer IV. It is notable that two occasional breaks are noticeable in the general sequence of the eastern section of YA1, presumably because of intrusion of fluvial elements. Ceramic assemblages indicate that such breaks, however, were not of a long duration. The more continuous and undisturbed stratigraphy from apparently early medieval to the late medieval structural phases is preserved in the northern section of ZA1.

Exploration on the structural material in the village have revealed regular occurrence of structures with varying brick sizes, in the form of mounds (Pl. III) and half-strewn structural alignment in modern habitation areas. The structure (Pl. IV), apparently part of a wall found in the Dattapara sector of the village (28.5 x 19.5 x 4.5 / 29.5 x 19.5 x 4.5 cm), deserves specific mention. The exploration has also resulted in the recovery of some Pala-Sena group of images, of which a Dhyan-Buddha and two Vishnu images are noteworthy. The present exploration in the Mangalkote area recovered a number of excellent early medieval sculptures of Brahmanical and Jain pantheons from the villages of Beladihi, Kurumba and Kshirgram, of which the image of the Jain Tirthankara Santinatha (132 x 19.5 x 5 cm) from the village of Beladihi (Pl. V) deserves special mention. It is important to note that Kshirgram also possesses a mound containing the ruins of earlier habitation including habitation remains. Besides, the region has a good number of major-minor settlements showing a long range of sequence of rural development from the BRW cultural phase. Barabehun, Arrah, Eruar, Mandalgram, Raigram, Pandu Rajar Dhibi, Goswami Khanda and Kolkol are the significant village sites containing secular and religious archaeological objects.

Kherua (KHR): It is a village along the left bank of the

river Ajay, 14 km north of Natunhat on the Natunhat-Shyamnagar road. There is a findspot of a Vishnu image (48.6 x 26.8 x 9.8 cm), besides occurrence of mixed varieties of dull red, buff and blackish grey pottery of medium to coarse category across the section of a tank.

Simulia (SML): Situated nearly 2.5 km east of Kundoa/Kudo, the village contains of temples, which stands over an old habitation debris. Nature of brick alignments beneath shows that the underlying structure was renovated at different points of time. Some broken pieces of Buddhist-Jain sculptures also scatter over this complex.

Angoria (AMG): It is situated 4 km east of Ketugram. Besides two Vishnu images datable to *circa* eleventh-twelfth centuries, some fragmented architectural members were also found. One of the Vishnu images from this site was also reported earlier in a Newspaper.

Jalpara (JLP): The village is located 13 km southwest of Natunhat along the Natunhat-Guskara road. Besides fragmented sculptural specimens, there is a findspot in the village containing a Siva-linga, large in size.

Paligram (PGR): The village is adjacent to Jalpara. The medieval temple complex in this village is archaeologically significant, as in and around the complex scatters of sculptural pieces and pottery abound.

Kudo/Kundoa (KND): The village Kudo is located 8 km west of Nigan near Niganchati. Besides sculptures of Jain and Brahmanical deities preserved in a local household, habitation ruins consisting of pottery and a fragmented Mahisasuramardini image was also found.

Besides, the region has a good number of major-minor settlements showing a long range of sequence of rural development from the BRW cultural phase. Baribelun, Arrah, Erwar, Mandalgram, Raigram, Pandu Rajar Dhihi, Goswami Khanda and Kolkol are the significant village sites containing secular and religious archaeological objects.

The Durgapur Block

Bharatpur (BRP): The site is situated 3 km south of Panagarh Railway Station, along the flood plains of the river Damodar. The mound has been excavated since 1971-72 when Eastern Circle of the Archaeological Survey of India (ASI) and the University of Burdwan jointly exposed a brick built Buddhist stupa at its base. A few sculptures of seated Buddha ascribed to *c. AD 900-1000* were also found (IAR 1971-72:50). In 1972-73 another excavation revealed more details of the stupa complex, and another trench on the mound revealed remains of 'Neolithic-Chalcolithic' habitations at the bottom, followed by an 'Early Iron Age Culture' layer, after which the site was deserted till the period of the construction of the stupa. The material recovered from the succeeding phase was marked by the introduction of early medieval pottery, iron, terracotta objects, beads of semi-precious stones and other associated findings (IAR 1972-73:36-37). The excavation during 1973-74 and 1974-75 resulted in the discovery of a four-fold cultural sequence:

Period I: Neolithic-Chalcolithic material including Microliths, Neoliths, steatite beads, copper objects, BRW and the other associated potteries etc. Period II: Iron Age materials. Period III: The remains of "Gupta" period. Period IV: represented by a dilapidated stupa complex of *c. AD 800-900* (IAR 1973-74:32-33; 1974-75:51).

Naskarbundh (NKB): It is a large village near Bharatpur. On a mound near this locality, a habitation debris containing potsherds, iron slag, terracotta objects possibly of early medieval and medieval periods have been noted.

Ranadiha (RND): This large locality in the Bud Bud Police Station area could be reached by walking along the bank of the Damodar, though it is the distance of about 6-7 km east of Bharatpur. In and around the village at least five spots have been located with the evidence of scattered potsherds, ruins of brick structures, and stray occurrences of sculptural fragments and other objects of different historical periods.

Shilampur (SLP): This is another important village near Bharatpur, which yielded the remains of ring wells, mud and burnt brick structures and potsherds of different historical periods. It is to be noted that the village has a sizeable Muslim population having a Dargah, possibly the earliest in this region. S.K. Ghosh of ASI (IAR 1972-73:35-36) also reports some Buddhist antiquities from the village.

Aima (AMA): The adjoining village of Aima along the river Damodar also has numerous stray occurrences of ruins comprising ring wells, potsherds, architectural and sculptural fragments and other minor evidence which dates back to early medieval and medieval period.

Pairagpur (PRP): The old locality of Pairagpur is now identified with the modern Panagarh Bazar along the Grand Trunk Road (G.T. Road). Its old habitation remains have been traced along the banks of local large tanks and cultivated paddy fields. Fragments of sculpture and architectural parts made of stone, terracotta balls and potsherds are the usual evidence of habitation debris noticeable here.

Kanksa (KNK): This village, adjoining Pairagpur, yields historically interesting account of its connection with a Sadgop lineage that ruled in Gopa *bhumu* and Senpahari. Though of very late date, there are remains of a small fort possibly built by the Sadgop rulers during the later medieval period. Two bronze Buddhist images found here are now in the personal collection of a villager.

Tilakchandrapur/Garadaha (TCP): Situated about 7 km north of Kanksa on Illam Bazar road, the locality has the ruins of a fort of late medieval period locally known as Rajgarh. However, the settlement might have been significant for the ruling community since the Pala-Sena period to mobilize the forest resources of this area.

Panagarh (PNG): The large village of Panagarh, geographically forming the western extension of Pairagpur, also has substantial deposits of habitation remains either on a low mound or along the banks of large ponds in and around the village. Potsherds, terracotta objects and

remains of brick structure have also been noticed here. There are few Siva-lingas made of stone noticeable in a late medieval temple and other temples of later period. These lingas can be dated back to c. AD 1200-1300.

Birudiha (BRD): From Panagarh the locality is about a distance of 5 km on G.T. Road towards Durgapur. However, besides some stray pieces of abraded sculptures and potsherds, the present investigation failed to trace any other evidence for strengthening its settlement history.

Rajbandh (RBD): This well-known locality along the G.T. Road has also yielded noticeable remains and antiquities belonging to the early medieval and medieval periods. Besides, the place has several large tanks believed to be the constructions of the local ruling chiefs of the aforesaid period.

Banskopa (BSK): It has an old settlement area scattered over a large territory on surface. There are low mounds in the southern part of the village strewn with habitation debris including potsherds, terracotta objects bricks and brickbats, though now these mounds are rapidly being converted into cultivated lands.

Gopalpur/Bandra Gopalpur (GPR): The village lies on a lateritic tract near Durgapur surrounded by low-lying alluvial land, which is now used as paddy fields. The modern habitational site of the village is located on the older one. Therefore, the earlier evidences are now almost covered by the modern constructions. Besides, a few modern temple sites the village has old structural ruins and exposed habitational debris containing potsherds, terracotta objects, iron slag, etc.

Arrah (ARR): It is one of the well-known localities near the northeastern part of Durgapur township at Bidhannagar. The main attraction of this village is its structural and sculptural remains, large tanks, local tradition and history mainly associated with origin and development of local power holding non-Brahmin communities (Gop, Sadgop, Ugrakhatiya and Dhibar). Broken pieces of sculptures, architectural fragments like doorjambs and lintels are

scattered over Goyalpara and Raipara sectors of the village. A few unidentified stone sculptures were also recorded near Bhagabati temple.

Bamun Arrah (BMA): It is at a distance of 3 km from Muchipara. There are two clusters of archaeological remains: (i) the temple site of Radhesvara lying at the northwestern end of the village and (ii) the other findspot located near Bhubaneshwar-Shibata in the central part of the village. There is a unique piece of Nataraj image still being worshipped as a *grama devata* (i.e., 'village deity') near the bank of a small pond. A few fragmented pieces of stone sculptures have also been noticed at the spot. Specific mention may be made of the habitation scatters to the back side of the RadheSvara temple. All these evidences can be dated back to the period between c. AD 900 to 1300.

Kuldih (KLD): This old village lies on the same route of Durgapur-Ajayghat/ ferry ghat, a few km. north of Arrah. Stray occurrences of the habitation debris, potsherds and big tanks having high banks with plum trees indicate the existence of an old settlement site.

Malandighi (MLD): It is the next large village on the same road towards Ajay ghat located above the flood plains of the river Kunur. This village has large ponds, high old occupational debris strewn with potsherds, iron slag, terracotta objects and broken pieces of polished stone tools found at different places. A few fragments of stone sculptures have also been noticed near Hat Tala. According to the local traditions the tanks around the locality are the constructions of the Sena period.

Syamarupagarh (SRG): The area, which is now known as Syamarupagarh (Ht. 'the fort of Syamarupa') or Gopblumgarh (the fort of Gopa *bhuma*) or Garh-jangal (the fort of forest land) is a long stretch of undulating lateritic upland covered with forest and looks like an island just above the flood plains of the Ajay river. Several investigations at the site helped us to gather some noticeable features of the site: (a) one of the important remains of the site is the ruin of a massive brick wall extended over a

large area. However, the alignment of the wall is not clearly understood, as there are some long gaps, which create confusion about the orientation of this wall. With the noticeable parts of this wall one can assume that the wall must have been used as an outer fortification of this settlement complex towards south. In this context we may note that the complex is naturally bounded, to the opposite side of the complex, by the river Ajay and its flood Plains, (b) much is not known about the character of other settlement ruins of the site scattered over the modern temple site of Syamarupa. Several small mounds containing mud bricks, burnt brickbats, potsherds, lateritic and schist varieties of stone blocks are the noticeable remains of this area. Forest encroachments, brick hunt and generally a gross civic negligence have reduced the evidence to this sorry state. The potsherds found here ranges from the early historic to late medieval periods. There are no sculptural specimens traceable here today. The local history also throws enough light on this fortified settlement complex but all the time the date of the site overlaps between early to late period. However, the current traditions about the site say that some local chiefs contemporary to Sena dynasty and the later rulers of Gop *bhuma* might have constructed this fortified settlement to take advantage of the location of this spot especially for warfare strategy.

Gourangapur (GRP): The site, more popularly known as Ichhai Ghoshier Deul (i.e., 'the temple of Ichhai Ghosh'), is very close to the above site standing along the river bank. The beautiful brick temple, a landmark for miles far and wide still stands in a good state of condition. It is survival of the rekha deul type prevalent in Orissa, but belonging to a considerably late variety, than what was earlier assumed (Banerji 1933:149, Chakrabarti 1993:165). The temple is said to be a construction of local ruling chief known as Ichhai Ghosh of Gopa *bhuma*. This man is associated in medieval literary sources with this territory, although his date is highly debated.

Apart from the above-mentioned sites of the undulated tracts covered with forest under the jurisdiction of Kanksa Police Station lying above the flood Plains of the river Ajay,

there are some other localities having different types of archaeological evidence in the form of habitation remains containing potsherds, iron slag and other minor antiquities. Among these, Garhkillia near Kherobari, Ayodhya-Bankathi, Bishnupur and Domra deserve special mention. Beside these large-scale settlement sites, this forest region also has several clusters of sites containing iron slag, Microliths and medieval potsherds incidentally surrounded by Santhal villages/hamlets.

Birbhanpur (BBP): It is a much-discussed site in the context of Microliths/Mesolithic period of Indian prehistory. Sankheswaritala located in the Central part of the village has scattered ruins of old temples, fragment pieces of Brahmanical and Jain images made of schist stones and the debris of older settlements containing potsherds and other minor antiquities. Among the sculptural fragments identified, a noted specimen is an image of Surya, which dates back to the Pala-Sena period.

Behula (BHL): The place is very close to the city centre of Durgapur township. There is a large elevated land locally known as Bhabani Pathaker Durga (the fort of the late medieval legendary hero Bhabani Pathak who was a dacoit, but was famous for his social welfare activities) standing with some settlement remains which include potsherds, iron slag and architectural fragments made of schist stone.

Nadhia (NDH): Once the seat of a local zamindar the village Nadhia lies among the river Damodar, a few km east of Birbhanpur. Bricks, brickbats, potsherds, terracotta objects and architectural members made of stone have been noticed at a place towards the north of this locality. The site, which was explored earlier, also yielded Neoliths and Microliths.

There are some other sites around the locality of Durgapur township like Bhiringi, Kuduria, Jamgara, Nachan, Mejhadihi and Kada-road which have also yielded similar evidence of settlement remains and antiquities (mostly in the form of fragmented sculptures) of the early medieval and medieval periods.

The Raniganj Block

Gram Andal (GAD): As the name implies, the village of Andal is about 2 km away from the Railway Station of the same name. The survival of old remains is noticeable either on the low mounds or along the banks of large tanks scattered over this locality. There are a few stone sculptural fragments still being worshipped as village deities either in modern temples or under the trees.

Sarpi (SRP): This is another large village which bears the habitation remains containing potsherds, iron slag and other fragmented minor antiquities noticeable in the north and the western part of the village. There are a few Sivalingas and an unidentified female sculptures enshrined in a modern temple of the village. The assemblage reflects an apparent early medieval morphology.

Ukhra (UKR): It is one of the larger villages near Andal having several late medieval temples. The place is well known for the seat of a local zamindar and commercial and mining activities. Early medieval and medieval remains in the form of stray architectural parts made of schist stones and large tanks attached with habitation mounds strewn with potsherds are the usual findings at the place.

Apart from above some other sites in this mining belt, which deserve special mention, are Kajora, Haripur and Baktarnagar.

Raniganj (RNG): It is an old market town, well populated by trading and other landholding communities. The existing remains concerning our period of study have been noticed at the localities of Kumarpara (potters' colony), Bhakatpara, Schoolpara, Thanagara and ferryghat along the river Damodar. Like other places here too scattered potsherds, terracotta and stone objects, extensive spread of iron slag and earthen objects possibly used for smelting iron reflect the general characters of the archaeological remains.

Sheharsole (SHS): The locality once the seat of a local zamindar, lies on the northern outskirts of Raniganj town. It is probably one of the oldest settlement of this area as indicated by some microliths and BRW sherds picked up from the mixed up assemblages of the early medieval and medieval period. There are a few sculptural specimens reported earlier from the site.

Mongolpur (MGP): Situated 2 km northeast of Raniganj town along the G.T. Road, the place also has several number of small mounds scattered with iron slag, potteries, terracotta objects and broken pieces of apparatus used for smelting iron ore. The pottery of this region ranges from the early historic to medieval periods. The nature of the assemblages suggests that these mounds were associated with Asura cultural population of Chhotanagpur region, which might have continued for a long period (for general discussions on the theme, see Roy 1920:393-433, Chakrabarti and Lahiri 1988:123-135).

Hijalgora, Badalpur, Chakdol and Paraskol are the localities near Raniganj from where stray occurrences of habitation sites containing iron slag, potsherds, and sculptural fragments have been recorded. There are a few deposits with large concentration of iron slag and potsherds indicating a large-scale iron working in this region, though there might have been one or two of these sites having the evidence of Asura cultural material showing close resemblance with those from the core Chhotanagpur regions.

The Asansol block

Asansol (ASL): The inclusion of modern industrial mining town of Asansol on the map of early medieval and medieval periods is an essential one. Its township along with the associated elements has no bearing on the archaeology of this large settlement. However, the place not only has strong tradition as a commercial centre of Bihar-Bengal borderlands, but also embodies diverse landholding groups, which are said to be the original inhabitant of the town.

Explorations at the place either on some stretches of

unoccupied land or on the exposed area resulted in the discovery of old habitation debris with potsherds, iron slag and other miscellaneous objects.

Ghagarburi (GBR): It is a popular cult-spot, associated with a local female folk deity after whom the site is named, located on the northern outskirts of Asansol town. The antiquity of this spot can hardly be traced out without in terms of that of neighbouring localities. However, at present one can notice potsherds, iron slag and some other defaced carved stones strewn along the bank of a nearby stream.

Damodar (DMD): The place near Bampur town is named after the river of the same name, which flows along its south. In all probability it was an important ferry ghat on the Damodar connecting other areas of old Manbhum district of Chhotanagpur region. There is the temple ruins now submerged into the river. Local traditions, bathing place and other stray occurrences of bricks, brickbats and architectural/sculptural fragments speak about the archaeological significance of the site.

Garni (GRU): It is a known temple site lying on the northwestern outskirts of Asansol. The temple that has been reported by R.D. Banerji (1933:149-151) is a unique example of late medieval type of Bengal style, made of stones and bricks. Banerji also reports an image of Vishnu once enshrined in the temple, which is now in the collection of Indian Museum, Calcutta. Besides the images of Pala-Sena period, the place also yields a few other remains and antiquities including three memorial stones with one inscribed specimen, architectural and sculptural fragments, and bricks of abandoned structures. Potsherds and iron slag have also been noticed from a nearby area of the village. Similar type of occurrences is also noticeable in and around Sitarampur, situated a few km west of this village. Besides, there is a findspot half km away from the village towards southeast, which still exists with some minor sculptural fragments (Vishnu and other deities) and ruins of a temple.

Domahania/Domani (DMN): It is a large old settlement near Asansol, involved in the procurement of local trading commodities. The modern habitation is lying on the older

one, which can be observed from the stray occurrences of earlier habitation debris found in and around the locality. Structural remains, blocks of copper and other metal bearing ores, debris of metal extraction containing slag, metal pieces etc. and potsherds could be traced at the western and northern parts of this trading centre.

Kelejora (KLJ): The village stands by the southern bank of a local stream (Kelejer), about a km west of Domahania. The archaeological evidence of this locality can be divided into two clusters: (a) at the entrance of the village there is a long stretch of unoccupied land clustered with burial stones reflecting the beliefs and practices of an earlier tribal group (Bhumij/Asura). In the present state of affairs, it is difficult to understand the orientation of these stones. However, Dolmen and Menhir type of burials must have been in practice here. The absence of such tribal groups and the present local memory indicate that it is an example of tribal retreat from this place to interior Chhotanagpur; (b) along the riverside of this village one can notice a large concentration of iron slag, Microliths and potsherds scattered over a large area.

Punchra (PCR): It is also a large old village about a km northwest of Kelejora. There are four clusters of archaeological remains distributed in and around it: (a) Sasthitala: The place is marked with a tree and five defaced stone images lying under a tree near the entrance of the village. The spot is the seat of a village deity in the form of folk goddess of Sasthi (a popular female folk deity). The defaced images located at this spot have been identified with two icons of Vishnu, one unidentified Brahmanical image and two images of Tirthankara. (b) Chowrangee More. As the name implies, the place is the meeting place of four village roads located in its central part. There is a low mound scattered with potsherds, iron slag, terracotta crucible, pieces of the nozzle of terracotta tuyere and other miscellaneous objects. The memory of the local people belonging to Jaina (Svarak/Sarak) group reflects that the place was the habitation site of their ancestors. (c) Sivasthan: It is the place where a number of damaged Brahmanical images are now kept on a modern brick platform. The spot, which was possibly a temple site, has

now turned to be a modern place of Siva worship. From the defaced images found at the spot one could identify two pieces of Siva-linga, one Vishnu image and two other unidentified icons. The sculptural style and the bricks found at the site suggest a date between c. AD 1200 and c. AD 1300. (d) Rajapara: It is probably a fortified settlement complex of a chief who is believed to have ruled in late medieval period. However, there are a few parts of stone architectural members, possibly re-used in this late settlement, which can be dated back to the period of the temple remains found at Sivasthan.

Churulia (CRL): The village near Asansol is located around a ruined fort on the river Ajay, in the old Pargana of Shergarh. There was an administrator of the Islamic period who built the houses and mosques from the stones of the fort. The fort and other earlier structures are said to have been constructed by a local chief named Raja Narottama who, according to local history, belonged to the Sikhara *bhuma* ruling family of Pancakota. A few habitation debris consisting of potsherds, iron slag and stone and terracotta objects could be dated back to early medieval period.

Gaurandi-Panuria (GDP): These are the two adjoining villages at a distance of about 15 km north of Asansol situated above the flood plains of the river Ajay. The investigations around a brick-manufacturing complex at the southern part of Gaurandi resulted in the discovery of old settlement ruins exposed through the earth-work on a low mound. The large concentration of potsherds, iron slag, burnt earth, furnace, potters' hearth and some other miscellaneous metal and stone objects here cover a long sequence ranging from BRW to late medieval periods. This is important to mention that some clusters here have yielded microliths, which are also found on a nearby lateritic tract.

Samdih (SMD): The place is a major coal-mining centre lying on Asansol-Rupnarayanpur road. The archaeological importance of this place is attached with two temples of pre-modern times and other associated materials in form of architectural members made of schist stone found at the nearby places. The local information regarding the

discovery of a few sculptures deserves special mention.

Muktaichandi (MTC): It is an isolated hill of this plateau region. The top of the hill is covered with trees and there is a modern worshipping spot dedicated to the folk female deity locally known as Muktaichandi (the folk goddess of Candi is popular in Bengal since medieval times). This spot also has a few collections of defaced sculptures and architectural members in damaged state of condition. The nature of these assemblages suggests that it once existed possibly as a temple site.

Apart from the above, there are a few villages like Athora, Lafganj, Amdih and Gholkiari located along the flood Plains of river Ajay, north of Asansol having widespread occurrences of archaeological assemblages. Most of such sites yield iron slag, potsherds and other miscellaneous antiquities ranging from BRW phase to the medieval/late medieval periods.

The Barakar Block

Barakar (BRK): This town, which is named after the river Barakar is a busy trading centre at the Bihar-Bengal border. The name of the town was generally understood to include the localities of Begunia, Lona, Munberia and several small nearby coal mining areas. To its west is located the hilly ranges of Panchet and Maithan. The archaeological importance of the town is mainly associated with the Siddhesvara Temple complex at Begunia. There are four well preserved extant stone temples enshrined by either Siva-linga or Ganesa, spread over an area just above the left bank of the river Barakar. Among the temples located here, one bears two inscriptions containing eleven and half lines and twenty one lines respectively. These inscriptions have been thoroughly studied (Dikshit 1922:23-110, Chakravarti 1936:21-25) and reveal the facts that the temple was first erected at this place called Sivapada in AD 461 by a lady named Haripriya, the wife of the king named Hariscandra and that it was renovated in AD 1546 by a man named Nanda, who was a votary of Madhava, but whose wife was famous as a follower of Hara. Whether these Hariscandra had any connection with the ruling

family of Pañcakota (the nucleus of Sikhara *bhuma* territory according to local oral history and some medieval narrative accounts) is still not properly known.

Kalyaneshwari (KLS): The site is famous as the seat of the goddess Kalyaneswari, situated 5 km north of Barakar within the jurisdiction of Hadla *manza*. The river flows along its west where the temple complex enshrining the female deity Kalyaneswari stands. Although the rapid renovation work and the crowd of the followers of this mother goddess caused many disturbances to the earlier remain of the site, the memorial stones, defaced stone images and fragments of architectural members are the noticeable elements for our period of study. Some memorial stones at neighbouring Digari, still worshipped as the original cult-spot of the goddess, may represent an antecedent phase of the development of this deity between the thirteenth and the fifteenth centuries.

Dishergarh (DSG): The site is believed to have been the seat of a subordinate of one of the rulers of Sikhara *bhuma* (Pancakota) ruler, who used this locality as his fortified settlement complex. As the name implies, the village is supposed to have been surrounded by a fortification/rampart wall, and is now converted into a modern residential/official complex of the mining zone. A visit to the ferry ghat on the riverbank of Damodar embles one to notice some clusters of assemblages comprising iron slag, potsherds, terracotta balls and fragments of stone objects.

Discussion: Contexts of Space and Assemblage

While considering distributional and typological features of these archaeological settlements, two points are immediately noticeable: firstly, the sites along the Damodar alluvial tracts have a sharp antecedent phase of genesis, as gleaned from excavated and explored data, from as early as the BRW-using cultural phase. Sites situated on the western-southwestern parts of this alluvial tract and across the forested zone, show considerable later developments, possibly representing a medieval horizon of progress. Secondly, it has been possible in many cases to demarcate the secular and religious spaces of activity on the basis of

availability of archaeological deposits. It is interesting to note that distinguishable identities have been maintained for habitation and/or religious activity areas within and between many of the settlements (compare the material assemblages of Tables 1 and 2).

Recent works on the social-political processes of early medieval Bengal have focused either on "Gupta" or "Early Medieval" phases, without any specific emphasis on the time segment that can generally be identified in terms of archaeological sources related to Sasanka. It is, however, very difficult to ignore this period, along with the strains of development at Karnasubarna and its neighbourhood at a local level and other micro level settlement zones at extra-local levels. A thorough comparative study of the excavated seals and sealings from Mangalkote and published coin motifs of Sasanka, found from the coastal uplands of southwestern West Bengal (Bhattacharya 1980:8-12), may reveal some specific resemblances in the parameters of development of local styles in coin and seal manufacturing. In that case, the impact of a stylus, developed under local temporal patronage, on the craft idioms of rural settlement locales is undeniable. The theme, however, deserves intensive and careful research.

Sites along, and more closely, the river Ajay may represent a comparatively later stage of settlement growth. This line of development is explainable politically in terms of the decline of the superior Sena lineage and more particularly with the emergence of the local ruling stratum

at Gopa *bhuma*. Located close to the larger rural settlements like Pandu Rajar Dhibi, Baneswar Danga and Mangalkote in one direction and Ghurisa and Mandira to the opposite in District of Birbhum across the Ajay, settlements in the Damodar basin area proper, as a result, witnessed major concentration of village settlements from the immediate post-Gupta period.

Site along the Barakar block like Garui, Dishergarh, Hadl and neighbouring areas might represent a stream of development quite in keeping with the pace that gave birth to the Sikhara *bhuma* political base with its supposed nucleus at Pancakota (lit. 'five forts'). One may suggest on cultural-historical grounds that the foundation of Pancakota and contemporary religious developments at Telkupi and Chharra to the west and Katrasgarh and Paundra to the north had considerably influenced the bordering Barakar-Asansol regions. Larger concentration of memorial stones (Bloch 1902-03:110) at many of these sites might suggest significant association of tribal elements in contemporary social polity (Beglar 1878:450-454). The marginal palaeographic evidence of the Garui sati stone inscription suggests a date not late than the thirteenth-fourteenth centuries AD.

A thorough study of extant literature in combination with the archaeological data provided above may lead, at least for the case of Sikhara and Gopa *bhumas*, to a more detailed picture of settlement history of this geographical territory.

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A Group of Temples at Kalna

S. S. BISWAS*

Kalna, (23° 13' N and 88° 22' E) a sub-divisional headquarters in the district of Bardhaman in West Bengal, is celebrated for a large number of beautiful temples. It is situated on the west bank of the river Bhagirathi, 125 km to the northwest of Kolkata and is connected by the Bandel-Katwa branch of the Eastern Railway. It can also be reached by bus or car plying along the road bifurcating from the Grand Trunk Road (Highway No.2). The town covers an area over five square kilometers, spreading over a long narrow strip of high land upon the river Bhagirathi. The history of Kalna can be traced from medieval period.

At this place there exist a number of magnificent temples with elaborate terracotta curving, which have earned wide reputation for their structural form and beauty. These temples were erected by the *Rajas* of Bardhaman and are found concentrated in and around an area known as the *Rajbari* complex (Plate I). Some of these structures have beautiful carvings on their walls showing a glimpse of the highly refined terracotta art of Bengal.

Most of the temples of Kalna were built during the time of Trilok Chandra (1744–1770) and Tej Chandra Bahadur (1787–1832) of the well-known Raj family of

Bardhaman. The history of this family started from *Raja* Chitra Sen, which was installed as *Raja* for the first time. Sometime afterwards Trilok Chandra received a *farman* from Badshah Shah Alam and has the title *Maharajadhiraja*. After Trilok Chandra, Tej Chandra, Pratap Chandra, Mahatah Chandra and Vijoy Chandra came in succession. Kalna was always a highly favoured seat of the *Raj* family of Bardhaman, which had a palatial House and most of the places of interest in the town have been closely connected with that family. Within the area known as the *Rajbari* complex there are as many as seven temples and outside the *Rajbari* area there are four temples. In this complex, Lalji and Krishnachandraji temples are of *Panchavimsatiratna* variety. These two temples are massive in character and known for their rich terracotta ornamentation. In Kalna there can be found all the varieties of temples prevalent in Bengal in great number. There are temples of the *chala* and *ratna* type. There also exists one *deul* type temple, Pratapeswar by name, which is found standing with profuse ornamental decoration upon its walls. The importance of these temples is that they have in most of the cases, dedicatory inscription bearing the name of the builders and the dates.

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Lalji Temple

The oldest temple among the Kalna group of temples is known as the Lalji temple. Dedicated to Sri Krishna, this temple is situated within the Rajbari complex area. Built with two successive stories, which are in the form of diminishing replicas of the main structure below, there are in all twenty-five towers arranged in three successive rows to be found upon three stories. These towers are arranged with twelve upon the lower storey, eight upon the next storey, four upon the storey above and one final tower at the centre of the top. In front of the shrine exists a small porch with three arched openings and a sloping roof of the *chala* type. The arches are spaced by two massive pillars, broad at the base and narrowing upwards. This massive temple is found decorated showing scenes of battle from the Mahabharata, anecdotes from the life of Krishna and floral and animal motifs of a very wide variety. Most of these decorations are to be found in vertical plaques set in different planes. There are to be found a number of projecting friezes arranged in vertical rows at each corner in this temple. These friezes appear like framed panels and are found filled with figures of horses, hunters, acrobats and fighting animals. The cornices are decorated with friezes of looped stalk and buds. There also exist enlarged friezes of palmettes in stucco above the cornices of each storey. The walls along the triple arched entrance are found decorated elaborately with wide variety of figures particularly dancers, warriors, hunters, women with children, ascetics and also monkeys and like. Upon the wall above the arches are to be found levelled compartments decorated with interesting designs and also human figures. Carvings are generally sharply detailed and precisely modelled, but with little depth. Along with a host of other deities of the Hindu pantheon there is a reclining Vishnu image here, which has been given great prominence than others. Srimati Brajakishori Devi, mother of Sri Krishnachandra, erected this temple in the year 1739 AD. (PLII)

Krishnachandraji Temple

The highly impressive Krishnachandraji temple, dedicated to Lord Krishna was built with a walled enclosure in the *Rajbari* complex. The massive body of the temple stands amidst a few other minor shrines existing by its side. Placed upon a raised platform serving as its base, the body of the structure rises upwards in three successive stories. There are miniature towers at each corner of the roofs in every successive storey, three in each corner of the first, two in each corner second, one each corner of the third, and there is one high tower at the centre of the roof on the top. In all there are as many as twenty-five *sikharas* to be found in this temple, which account for its being known as a *Panchavimsati ratna* temple. In front of the temple there is a porch having a *chala* type roof with three arched openings, having elaborate terracotta decorations. These decorations include creeper and floral designs of a very wide variety. Also there are human figures shown in various poses accommodated within regular recesses, arranged in perpendicular rows. There are two rows of decorations along the basement, one broad and one narrow, filled with ornamentations, showing human and animal figures in various poses and movements. The temple was erected by *Maharani* Lakshmi Kumari Devi, the senior consort of Raja Chitra Sen in the year 1751 AD, during the time of *Maharaja* Trilok Chandra.

Vijoy Vaidyanath Temple

This temple, known as the Vijoy Vaidyanath temple, is formed in the Bengali *at-chala* variety. This simple *chala*-temple is situated near the massive *panchavimsati ratna* temple of Krishna Chandraji and within a walled enclosure. The temple plan is almost square and there is a plain *char-chala* structure at its base. Upon this rises another *char-chala* tower with three insignias placed above. The temple is extensively decorated with terracotta ornamentations, which are mainly to be found upon the façade. The front of the façade is formed with the usual three arched openings. One Srimati Lakshmi Devi, the wife of Sri Mitrasen Ray, built this temple during the time of Trilok Chandra in the year 1763 AD.

Rupeswar Siva Temple

The temple of Rupeswar Siva is completely different from the other temples in the Kalna group. This temple belongs to the category of the flat-roofed type. The temple stands on a raised platform, providing a narrow passage around for circumambulation. The façade, which was elaborately decorated with terracotta plaques, are now worn out, only a few decorative patches remain to be traced. The attractive façade has three arched openings. The arches are resting upon two massive pillars. Srimati Rup Kumari Devi, the senior consort of Maharaja Trilek Chandra, erected this single-storied brick built temple in 1765 AD. (Pl. III).

The Pancharatha Group of Temples

Mention may next be made of a group of five temples, which are known as the *pancha ratha* group. These *pancha ratha* temples are all of the *at-chala* variety. Built in a row, there are five small shrines of different height. Three of these are built together upon the same plinth, at the middle and the rest two are placed at the two ends. Each shrine has got low-arched openings in front. These temples are less decorated and were built in the early 19th century by the *Raj* family of Bardhaman.

Girigobardhan Temple

This temple, known as the Girigobardhan temple in the Kalna Group is of an unusual character and is completely different from other varieties of temples popular in Bengal. This temple has the appearance of a hill, supposed to represent the mount Govardhana of Vrindavan. The temple is dedicated to *Sri* Krishna. The stone cuped roof of the temple is extensively decorated with animal and human figures. The *Raj* family of Bardhaman built it in the early 19th century.

Pratapeswar Temple

Single *sikhara* (*ekratna*) variety temple is famous for its extensive ornamental decoration. Dedicated to god Siva,

this temple is a square structure, which stands on a raised platform (Pl. IV). It has one arched opening in the front and single curvilinear *sikhara* above with a pointed top. The three sidewalls and the façade of the temple bear beautiful ornamentations of a very wide variety (Pl. V). The corner elements are repeated without the plaques creating bands of horizontal ridged elements. The most noticeable features are the miniature figures encased within tiny niches, framed with European style colonnades. In the sidewalls can be found rows of panels shown covered with busts of human figures, both males and females (Pl. VI). The friezes upon the bases are mostly in three rows, of which the upper frieze has lobed niches at the bases of the raised wall bands, decorated tufts of foliage. The subjects illustrated in these friezes include guardians, warriors, wrestlers, female musicians and dancers, drummers, figures of Lord Krishna and other deities. The horizontal cornices generally incorporate a frieze of foliation on curved leafy brackets and additional row of Krishna figures and dancers, also enhancing the beauty of the temple. The most intricate entrance frame of the temple is found decorated with a large number of Krishna figures and female attendants. The carvings are so lively that it seems that all the figures are full of animation as if projecting outwards. The panels above the arches are arranged in three rows. These panels (Pl. VII) show figures of Rama and Sita seated on throne, framed within compartments. Such Ram-Sita panels are shown accompanied by dancers and musicians. Besides such panels there also exist decorative panels showing scenes depicting battle between Rama and Ravana, Durga slaying the demon Mahishasur and Krishna playing flute, surrounded by adoring *gopinis*. This temple is no doubt a distinctive example of the *rekha* variety temple, quite rare at such late date. Srimati Pyari Kumari Devi, the chief consort of Raja Pratapchandra in the year 1849 A.D. built the temple.

Outside the Rajbari compound there are four other temples, which are all declared protected by the Archaeological Survey of India. Among these temples, two are of the simple *panchrama* type. The dates of erection of these temples are, however, not known.

Ratneswar Temple

Of these edifices one *pancharatna* temple, dedicated to God Siva has been known as the Ratneswar temple. It is found to exist in dilapidated condition. The temple stands upon a raised platform with a narrow passage around. There were originally two small towers, which are now in a completely broken state. The façade has also come to ruin. The usual three-arched opening with a few ornamentations above the arches is the only surviving features to be noted; otherwise the decorations are completely worn out and lost. The temple stands upon almost a square plan, being 5.10 m square in length and breadth. This brick - built temple is dateable to c. 19th century AD.

Jaleswar Temple

This temple known as the Jaleswar temple is dedicated to God Siva. Built in brick with five towers in the *pancharatna* style, this temple stands on a very high plinth. The temple façade is simple with the usual three-arched opening, the arches resting upon two well-shaped pillars. A few decorations are found from the upper part of the pillars and the curved cornice. This temple is dateable to c. 19th cent. AD.

Gopalji Temple

Outside the Rajbari complex area, there stands a beautiful *panchavimsati ratna* temple known as the Gopalji temple, which stands upon a rectangular base (13.65 x 12.10 m) and is found, marked with all structural distinctiveness of the temples of this type. Dedicated to Gopala Krishna this temple has altogether twenty five *sikhara* towers arranged with three towers at each corner above the first roof, two towers at each corner of the second roof and five towers on the top roof. In the front, there is a porch with *chala*-type roof above. The sparsely decorated front wall has three arched openings. Ornamentations can be found upon the side walls and a few in upper stories. Human figures in dancing attitude, and some floral motifs are to be seen on terracotta plaques. The corners are fully decorated with figures of wild animals and human warriors.

A devout Kshatriyal employee of Maharaja Trilok Chandra erected this brick built temple in the year 1766 AD.

Rameshwar Temple

Next to the Navakailasa group of temples, mention may be made of the Rameswar temple, also dedicated to God Siva. Built in brick, the temple is of the typical Bengali *at-chala* style. The usual insignias at the top surmount the *at-chala* roof. The front portion of the temple is found extensively decorated with terracotta carvings but the sidewalls are sparsely decorated showing only a few vertical linear compositions. These linear compositions are shown stretching from top to bottom, apparently intended to break the monotony of the wall. The usual three-arched opening is spaced by two massive pillars. The pillars, the cornices and the space above the pillars are fully decorated with numerous terracotta plaques. The corners and the base friezes were adorned with similar decorated plaques but most of the plaques are no longer to be found in place and can be presumed as missing. Srimati Bison Kumari Devi, the heroic mother of Maharaja Tej Chandra Bahadur, built the temple in the year 1783 AD.

Navakailasa Temple (108 Siva Temple)

Mention may next be made of an elaborate temple complex, which is known by the name Navakailasa, is unique in its design. There are as many as hundred and eight shrines in this complex. Though so many in numbers, yet the shrines are not of any great height. These temples are placed within an expansive area in a fascinating arrangement of structural setup. The temples are laid out in two concentric circles, one within the other. There are seventy-four shrines along the outer circle and the rest thirty-four are placed along the inner circle. Each temple stands upon a square plan, being 1.9sq.m. in length and breadth and rises to a height measuring 5.88 m. The lingas installed within the shrines have interesting variation in respect of the stones with which the lingas are made. Within the shrines along the outer circle, the lingas are to be found in white and black marble alternatively. The lingas in the

shrines placed along the inner circle are all made of white marble. All the shrines are of the *ut-chala* variety, the façade in each having a single arched opening. These façades are found decorated in a simple manner. Maharaja Tej Chandra Bahadur of the Bardhaman Raj family built this temple complexes in the year 1809 AD, (Pl. VIII).

The temples existing at Kalna may be held as creations of very high achievements of architectural endeavour, revealing wide imagination and sense of beauty. The background of the *Raj* family of Bardhaman and their deep and profound attachment to strong religious pursuits had

given shape and character, to these temples, some of which are quite massive in character particularly those belonging to the *panchavimsati ratna* group. The temples are all unique in their structural and decorative features. Even the small *ekaratna* temples like the Jaleswar temple are quite distinctive in character. The Archaeological Survey of India has declared these temples as protected monuments since 1965 and the conservation and restoration work have been undertaken with great consideration. The extensive repair work has made it possible for some of these temples to attain their original shape and appearance.

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Evidence of Dental Palaeopathology and Diagenesis in the Khatri Collection of Fossil Vertebrates in the Indraprastha Museum, New Delhi

VIJAY SATHI^{*}

Fossils are indeed an indispensable evidence, without which there will not be any palaeontology! And without the growth of collections the subject of palaeontology may cease to grow. Study of museum collections of fossils has a rich legacy of several centuries as one of the prominent sources of knowledge regarding the ancient animal world. It also relates to their past distribution, evolution, extinction, adaptation and lastly the palaeoenvironment of the landscape they shared with early man in Pleistocene period.

A sizable collection of mammalian fossils housed in the Indraprastha Museum of Art & Archaeology, Indian Archaeological Society, New Delhi, India is one such example. It holds significant information with respect to the late Cenozoic mammalian fauna of India. It was collected by one of India's leading prehistorians and Quaternary geologists, late Dr. A.P. Khatri, during his extensive field investigations spread over the period of about two decades (late 50s to early 70s) in the Siwaliks of the NW India and Central Narmada Valley (M.P.). The paper describes the salient features of the fauna and goes on to highlight a very rare example of dental

palaeopathology and taphonomy. The museum collection has far-reaching phylogenetic and palaeoenvironmental implications, applicable on a wider canvass of Quaternary Indian Vertebrate Palaeontology.

Geological Provenance[†]

The fossil material under study comes from Siwaliks (Fig. 1) and the Narmada Valley (Fig. 2). In his in-depth review of Siwalik Palaeoanthropology, Khatri re-examined the taxonomic positions of several hominoids and palaeoenvironments of the Middle and Upper Siwaliks. He also reported a complete mandible of a primate resembling that of living loris and collected taxonomically diverse and well-preserved fossilised remains of large ungulates primarily from three locations, viz. Nagri and Pinjor beds of Haritalayungar, Chakrana (Dist. Bilaspur, H.P.) and Ramnagar and Surajpur (Dist. Jammu, J.&K.). Based on geochronological, lithostratigraphic and faunal data, these ranges can be chronologically assigned late Miocene (base of Middle Siwaliks) to the Lower Pleistocene (Khatri 1972).

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[†] Since the fossils were collected by Dr. Khatri, the litho-stratigraphy and the context in which the fossils were discovered have been drawn from Khatri (1966 & 1972).

The vertebrate fossils from Narmada Valley were mostly collected *in situ* from four horizons viz, Boulder conglomerate, Cemented sandy gravel, the yellow or pinkish cross-bedded sand and Bracia and gravel which have been named as Gravel I to IV, successively by Khatri in his comprehensive account of biostratigraphy of Central Narmada Valley (Khatri 1966). He argued that the fossils from Gravel I are 'thoroughly fossilised while the surface finds look less fossilised, and may have come from the younger deposits. He further added that the bones from Gravel I hence may be assigned to Middle Pleistocene age. However, based on recent geomorphological observations, fauna and a few radiometric dates available, the Narmada fauna can be assigned to late-Mid Pleistocene age (Agrawal 1988; Patnaik *et al.* 2005). Besides the *in situ* occurrence of fossils from the sites mentioned above, a number of vertebrate fossils are part of a surface collection from the fields along the banks of tributaries like Barurewa and Sher in the Narsinghpur District. Even though these bones do not conform to a definite stratigraphical unit, the associated matrix and the nature of preservation indicates sandy pebbly gravel as their unit of provenance.

Fossil Assemblage

There are approximately 356 Number of Identified Specimens (NISP) which include the fossils from Siwaliks of the NW India, Central Narmada Valley and a few fragments from Godavari Valley. A small collection of molluscs came from Tertiary and Quaternary deposits of South India and Myanmar.

The Bones are generally in good state of preservation save in a few cases where post sampling, crating and conservation has damaged some specimens, especially in case of bovine crania and elephant dentition. The stages of tooth wear, epiphyseal fusion and cranial measurements suggest adult age at the time of death. However, owing to the absence of adequate diagnostic parameters, sex determination remains mostly indeterminate. One of the most significant features of this collection is the presence of sizable number of calvaria of hippo, cattle and buffalo

and a large amount of well-preserved dental remains. This is indeed a significant piece of evidence which allows morphometric analysis possible for phylogenetic and taxonomic interpretations. Majority of fossils from Narmada (e.g., at Devakachar) are the outcome of the detailed excavations Dr. Khatri undertook, and interestingly in association of Acheulian artefacts in excellent state of preservation.

The present paper confines its scope to a couple of noteworthy examples of pathology and taphonomy which may help understanding the complex issues of palaeoenvironment and depositional setups the bones were exposed to in Pleistocene antiquity.

Palaeopathology

An isolated lower tooth belonging to *Elephas planifrons* from the Siwalik beds is perhaps a unique example of pathology (Sathe 2005) that deserves a special attention in this paper. The specimen is represented by a root of three complete ridges while one of them is survived by a single enamel fold. Towards the distal end of the tooth, the last two ridges have abnormal swelling at the buccal side and the crown view shows an incision-like phenomena between the ridge dividing it into a Y-shaped plate structure. The deformed enamel plates are inclined obliquely to the antero/posterior axis of the molar. This malady refers to Enamel Dysplasia with dilaceration (distortion in the normal anatomical shape of the tooth). It is a distinct case of developmental dental pathology that could have been triggered by impaction owing to a short span of retarded cycle of 'eruption/use/wear and loss'; especially with regard to its 'in-use' predecessor.

Elephant Dentition and the Process of Tooth Eruption

Elephant teeth are high-crowned (hypsodont) with rasp-like biting surface which is structured for grinding fibrous and highly abrasive, siliceous material. It is a complex structure evolved through various adaptive steps in its nearly 50-million-year history of evolution. Every

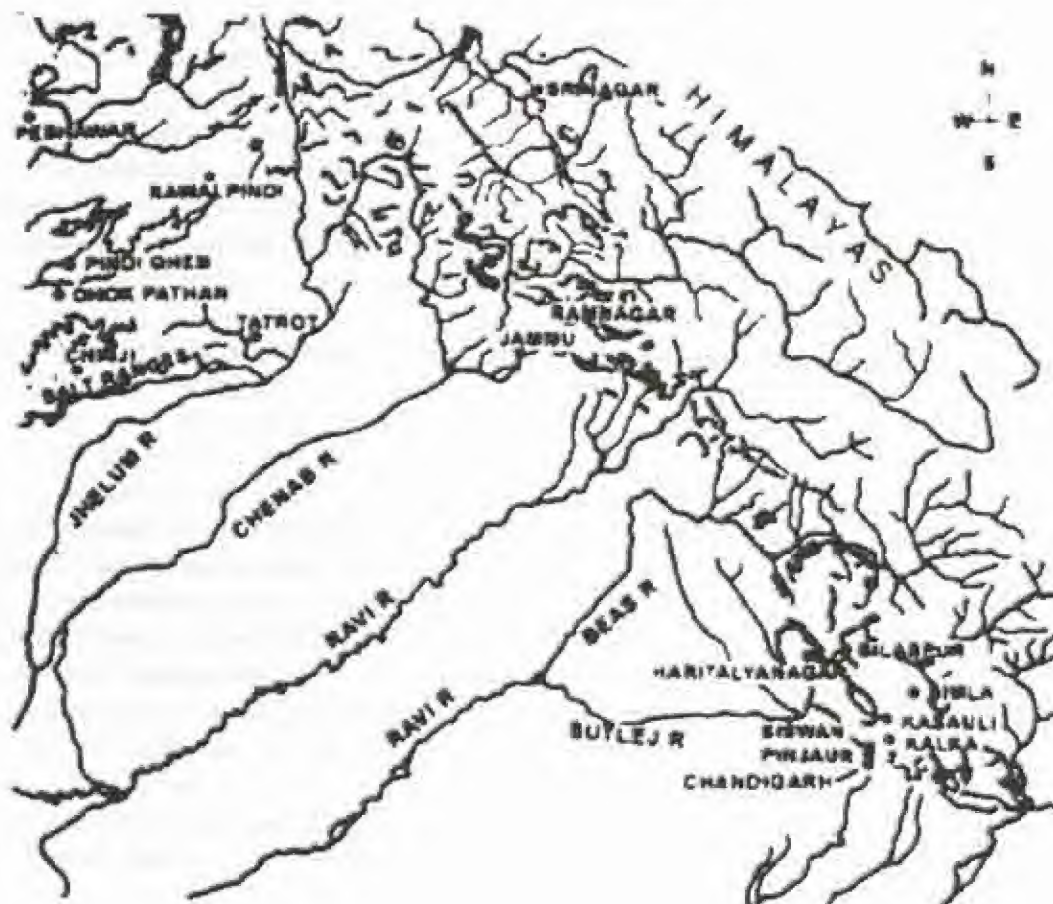


Fig 1. Fossil bearing sites in the Middle and Upper Siwaliks in the NW India

molar is comprised of several vertically arranged ridges or parallel enamel plates which are filled with dentine and covered externally with cementum. The fundamental design, dental formula, the process of dental development, tooth wear and its bearing upon the process of tooth replacement, programmed sequence of tooth eruption, the role of diet in tooth development and eventual loss of dentition; all render elephants unique in the world of mammals. Throughout all their lifespan they produce six sets of teeth in each quadrant of their mouth, implying a total of 24 molars erupting in sequential pattern. However, the process of tooth development, wear, loss and the rate of tooth replacement are sensitive to the environmental fluctuations and hence the ideal situation of having four

functional teeth at any one time is rarely met with. It is a genetically-controlled procedure that governs gradual abrasion and final loss of the existing teeth which in turn are replaced by 'succedaneous teeth,' already developing directly behind and below them. Over the period of time, subject to different geographic settings, these animals have acquired a definite rate of growth and replacement of their molars (Kingdon 1971; Laws *et al.* 1975).

Tooth eruption among elephants commences even prior to their first molar having been mineralised to function normally. Initial 6 to 12 months of diet involves mother's milk, followed by soft grasses. Since the diet is generally rich in opaline silica, making it an extremely

abrasive food, complete dependence over the cellulose-based diet occurs only when the calcification of the 'in-use' tooth is achieved adequately. The observations on young elephants in captivity (Fagan *et al.* 2001) reveal that if the rate of abrasive wear of 'in-use' primary tooth exceeds the rate of mineralisation, pulp tissue gets exposed and infections are set in (Fagan *et al.* 1998). Hence, generally enough care is taken for nearly two years to ensure the balance between the abrasivity co-efficient of juvenile's diet and the rate of mineralisation of the continuously calcifying immature and developing teeth of young elephants. Contrary to the earlier scenario, after a few years, as the advance in the process of calcification strengthens enamel against excessive dental wear, certain amount of abrasivity becomes inevitable. It implies that the rate of tooth attrition in a particular habitat is determined by the natural abrasivity of the food available in the area. Irrespective of the natural processes of tooth replacement, the persistent lack of abrasivity in the diet may arrest the biological rate of dental growth and development, causing malocclusion. In other words, this dietary abrasivity is an essential accelerating agent for the onset of a lifelong process of eroding away the chewing surfaces of the teeth at a uniform rate to accommodate the programmed pace of tooth wear, growth, and tooth replacement. If the normal abrasive wear is retarded, the 'in-use' tooth is unable to drift away, giving rise to its impaction by the eruptive forces of cortical bony contour of the alveolar process that push it further, resulting in the arrest of a normal growth of the succedaneous tooth (Fagan

et al. 2001). Interestingly elephants do exhibit preference for using one side of the jaw which may result in one side suffering more of wear and attrition of the crown. With systematic abrasion and a final shedding of 'in-use' tooth the subsequent 'successors' (also known as 'succedaneous teeth') move forward to assume their positions to substitute or replace their predecessors, as part of tooth replacement.

However, such a preferential use of dentition, and a change in the rate of natural abrasivity of the food have far-reaching influence on the dental occlusion. Thus underlying influence of synchrony between the biological molar eruption schedule and the quality of food available to them play a pivotal role in preventing any malocclusion. Initial visual clinical symptoms of malocclusion are mal-positioning of the opposing maxillary molar (Fagan *et al.* 2001). A nineteenth-century veterinarian, Sterndale (1884), was the first to point out that not only the cellulose diet but also the sand and grit, entangled in the roots and plants ingested by the animal in wild state, helps in accelerating the process of dental wear. Cleaned food given to them contributes to the deformity of plates piling over one another with a distinct lack of genetically defined orientation.

Enamel dysplasia, and dilaceration, if not detected, can be fatal to the pachyderms in captivity (Fagan *et al.* 2001). The dentition of several Quaternary fossil elephants from Eurasia have shown a variety of pathological lesions

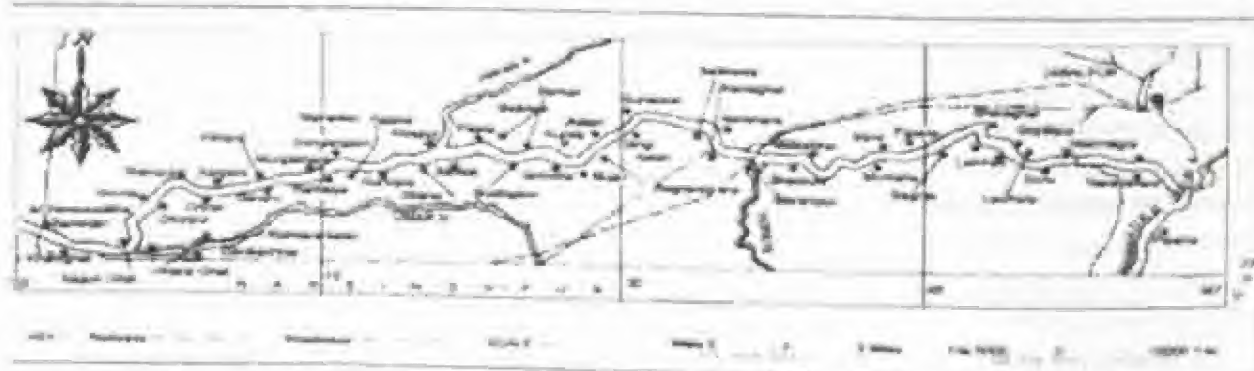


Fig 2. Locality Map of Central Narmada Valley, showing fossil yielding sites prospected by Dr. Khatri

such as malocclusion, malformation of lamellae and linear furrows in the crown cement (Wojtal 2001; Niven and Wojtal 2002; Maschenko and Shapansky 2003). Periodic physiological stress and the lack of co-efficient of abrasivity is attributed to the cause of these maladies (Niven and Wojtal 1999, 2003). The evidence of enamel dysplasia in the present specimen of *E. planifrons* is indeed a very rare example in Indian context. Identifying pathological lesions is a prerequisite in going a step further in understanding better the palaeolandscapes in the Indian subcontinent.

Taphonomy

There are a number of specimens affording detailed taphonomic investigations. As regards the Neogene-Early Pleistocene material from the Siwaliks, the teeth are very well preserved, allowing a precise checklist of taxa. The long bones are mostly represented by shafts which exhibit considerable amount of abrasion as well as breakage signifying fluvial dispersal as a modifying agent in its preservation.

Since sizable amount of bones from Narmada Valley were excavated in association with late Acheulian and Middle Palaeolithic artefacts and have been recorded in accordance with a definite stratigraphic association, a search into the life histories of these fossils makes it a worthwhile endeavour. For surface features of preservation, several bones, crania and dentitions were short listed. Abrasion, breakage, post-burial modifications (sediment load distortion and bioturbation) have been some of the important factors of preservation bias. Mention must be made here of one of the type representations of diagenesis evidenced on a complete lower dentition of a smaller cervid (deer). Near total encrustation of the diagenetic part of the specimen deters precise identification. Both the jaws are joined together with a stubborn but fine calcareitised silty clay. Mandibular symphysis is fused but jaws are close to each other and coronoid process of the right jaw displaced from its original position. Both the jaws are fractured in the middle

of the jaw length. Crown view reveals displacement of teeth from its normal orientation. Though corpus mandible is partially broken, absence of any further damage to the specimen has kept it in a pristine state. The '0' stage of weathering (Behrensmeyer 1978), embedded matrix and completeness of the lower dentition have drawn the attention to investigate the reasons of such a preservation.

An Exceptional Case of Preservation: Window to the Life History of a Fossil?

The site of Devakachar (23°23' N; 79°07' E) that yielded cervid symphysis is a well-known fossil-bearing locality for large and microvertebrate concentrations. The specimen belongs to the assemblage Khatri had reported *in situ* from a vast body of fossil assemblage in association with Palaeolithic artefacts from the yellow-brownish concretionary silt and clay horizon; overlying cemented gravelly bed which he assigned to Gravel II (Khatri 1966). Faunal diversity at this site characterises a wide range of animals such as rodents, fish, frog, insectivore, crocodile, large carnivores, elephants, bovids, equids, hippos and turtle (Khatri 1966; Salahuddin 1989; Patnaik *et al.* 1995; Biswas 1997; Patnaik *et al.* 2005). Microvertebrate fauna shows owl predation as a cause of death and etching due to gastric acidic environment prior to burial. The owl pellets were deposited in the meanders with a rapid sedimentation, preventing further information loss (Patnaik 1995). As regards the large mammal remains, concretionary silty clay and sandy pebbly gravels have yielded the assemblage which often appears compromised on account of pre- and post-burial forces of taphonomy. Against this taphonomic backdrop of a diverse palaeolandscape at Devakachar, interestingly the cervid dentition offers fresh insights into the effects of diagenetic processes, as an attempt to understand as to how a bone would 'respond' to the dynamics of various stages of taphonomy.

Alteration after burial is often implied as the process of diagenesis (Retallack 1990), that underlies the post-depositional processes which may or may not modify the

shape and physical appearance of the skeletal remains. However, once the bones have been buried, a number of taphic and anataxic factors are operating among which the deformation is central to the fate of the physical appearance and size of the bones. Martill (1990) argued for three-tier set up of diagenesis, viz., the bone tissue, porous spaces and cavities within bones, and lastly the sedimentary context of the buried bone. The sedimentary context has a far-reaching consequence in determining the shape of the bone, the nature of ground water and to what extent the buried bone is distorted or fractured due to presence or absence of diagenetic cement material. Deformation indicates post-depositional change in the shape of the bone, (without a breakage) due to the compaction from the weight of overlying sediment load (Shipman 1981). The grain size and composition of the sediments are highly significant parameters for compaction-oriented deformity (Behrensmeyer 1975; Briggs 1990). Sedimentary matrix that the present specimen is embedded in is composed of fine silt and clay, lacking porosity. The conjoining parts of the broken and deformed jaws are still together, integrated with diagenetic cement and in contact with each other. The displacement of the ramus on account of deformity that preceded fracture and the lack of absence of biostratigraphic processes confirms that the deer jaws had a rapid burial in channel-fill deposits while the bone still retained some amount of plasticity.

The Siwalik elephant tooth and a cervid dentition from Narmada Valley provide a unique opportunity to examine some of the rare phenomena that have significant bearing on the environmental interpretations, central to Palaeontology. However, detailed and thorough survey of dental pathology on both living and fossil elephants from different parts of the world holds a key to understanding the etiology of these maladies. As regards taphonomy, precise identification of individual steps of modifying processes will be a major mile-stone untimed in decoding the life histories of fossils records. The Khatri Collection in fact offers fresh insights into the aspects of pathology, taphonomy and an array of osteological parameters for

taxonomic and phylogenetic interpretations.

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Table 1 Fossil Vertebrates from the Siwaliks of Northwest India

Genus/ Species	Haritalayungar (Middle Siwaliks)	Sarajpur (Upper Siwaliks)
Primate	+	-
Carnivore	+	-
<i>Rhinoceros sivalensis</i> (Falconer & Cautley 1849)	+	-
<i>Hipporion antelopinum</i> (Falconer & Cautley 1849)	+	-
<i>Equus sivalensis</i> (Falconer & Cautley 1849)	-	+
<i>Hexaprotodon sivalensis</i> (Falconer & Cautley 1846)	+	+
<i>Stepodon insignis ganesa</i> (Osborn 1942)	+	+
<i>Elephas planifrons</i> (Falconer & Cautley 1845)	+	+
<i>Elephas hyndriensis</i> (Falconer & Cautley 1845)	+	+
<i>Elephas indi</i>	+	+
<i>Cervus sivalensis</i> (Lydekker 1880)	-	+
<i>Cervus panjabensis</i> (Brown 1926)	+	+
<i>Hydapsitherium megaciphatum</i> (Lydekker)	+	-
<i>Bos acutifrons</i> (Lydekker 1880)	+	+
<i>Antelope subnorma</i> (Pilgrim 1937)	+	-
<i>Gazella lydekkeri</i> (Lydekker 1886)	+	-
<i>Helicopartus/ Strepsipartus</i>	+	+
<i>Strepsipartus</i> (Pilgrim 1937)	+	+
<i>Sus/Hypohys</i>	+	-
<i>Sus hyndriensis</i> (Falconer & Cautley 1847)	+	-

Table 2: Fossil Vertebrates from Central Narmada Valley, Distts. Narsinghpur & Hoshangabad (M.P.)

Genus/Species	Devakachar	Umaris	Barurewa	Bangaria
Carnivora	+	+	-	-
<i>Equus namadicus</i>	+	-	+	-
<i>Stegodon insignis ganesi</i>	+	+	-	+
<i>Elephas hyndricus</i>	+	-	+	+
<i>Elephas namadicus</i>	+	+	-	-
<i>Bos namadicus</i>	+	+	+	+
<i>Bubalus palamandicus</i>	+	+	-	-
<i>Bovellaphus tragocamelus</i>	+	+	-	+
<i>Antelope cervicapra</i>	+	-	-	-
<i>Sus hyndricus/namadicus</i>	+	-	-	-
<i>Hexaprotodon palamandicus</i>	-	-	+	-
<i>Hexaprotodon namadicus</i>	-	-	-	+
<i>Cervus antelope</i>	+	-	-	+
<i>Axis axis</i>	+	-	-	+
<i>Crocodylus</i> sp.	+	-	-	-
<i>Titanus</i> sp.	+	-	+	+

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Genetics and the Aryan Debate

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Background

Along with the birth of anthropology, the nineteenth century saw the development of semi-scientific to wholly unscientific disciplines, such as anthropometry, craniometry or phrenology. Unquestioningly accepting the prevalent concept of race, some scientists constructed facial and nasal indexes or claimed to measure the skull's volume for every race, of course with the result that the white race's cranium was the most capacious and its owner, therefore, the most intelligent, others went further, insisting that amidst the white race, only the Germans were the 'pure' descendants of the 'Aryan race,' which was destined to rule the earth.

In India, from 1891 onwards, Herbert H. Risley, an official with the colonial government, set about defining in all seriousness 2,378 castes belonging to 43 'races,' all of these on the basis of a 'nasal index.' The main racial groups were Indo-Aryan, Turko-Iranian, Seytho-Dravidian, Aryo-Dravidian, Mongoloid and Mongolo-Dravidian. Unfortunately, this imaginative but wholly unscientific work weighed heavily on the first developments of Indian anthropology. For instance, in the 1930s, B.S. Guha studied skeletons from Mohenjo-daro and submitted a detailed report on the proto-Australoid, Mediterranean, Mongoloid

and Alpine races peopling the ancient city, all of them 'non-Aryan,' of course. Long lists of such fictitious races filled academic publications, and continue to be found in Indian textbooks even today.

In the wake of World War II, the concept of race collapsed in the West. Rather late in the day, anthropologists realized that 'race' cannot be scientifically defined, much less measured, thus setting at naught a whole century of scholarly divagations on 'superior' and 'inferior' races. Following in the footsteps of pioneers like Franz Boas¹, leading scientists like Ashley Montagu² now argued strongly against the 'fallacy of race.' It is only with the emergence of more reliable techniques in biological anthropology that anthropometry got a fresh chance; it concentrated not on trying to categorize noses or spot 'races,' but on tracing the evolution of a population, on signs of continuity or disruption, and on possible kinships between neighbouring populations.

In the Indian context, we are now familiar with the work of U.S. anthropologists Kenneth Kennedy, John Lukacs and Brian Hemphill³. Their chief conclusion, as far as the Aryan debate is concerned, is that there is no

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trace of "demographic disruption" in the North-West of the subcontinent between 4500 and 800 BCE; this negates the possibility of any massive intrusion, by so-called Indo-Aryans or other populations, during that period.

Die-hard proponents of such an invasion/migration have therefore been compelled to downscale it to a "trickle-in" infiltration¹, limited enough to have left no physical trace, although they are at pains to explain how a "trickle" was able to radically alter India's linguistic and cultural landscape when much more massive invasions of the historical period failed to do so². Other proponents still insist that "the Indo-Aryan immigrants seem to have been numerous and strong enough to continue and disseminate much of their culture,"³ but do not explain how the 'immigrants' failed to leave any trace in the anthropological record.

A Powerful New Tool

In the 1980s, another powerful tool of inquiry came on the scene: genetics. It has the ability to read the history contained in a human body's three billion bits of information. In particular, techniques used in the identification of genetic markers have been fast improving, leading to a wide array of applications, from therapeutics to crime detection to genealogy. Let us first summarize the basic definitions relevant to our field.

In trying to reconstruct ancestry, biologists use two types of DNA, the complex molecule that carries genetic information. The first, Y-DNA, is contained in the Y-chromosome, one of the two sex chromosomes; it is found in the cell's nucleus and is transmitted from father to son. The second, mtDNA or mitochondrial DNA, is found in mitochondria, kinds of power generators found in a cell, but outside its nucleus; this mtDNA is independent of the Y-DNA, simpler in structure, and transmitted by the mother alone. For various reasons, all this genetic material undergoes slight alterations or 'mutations' in the course of time; those mutations then become characteristic of the line of descendants; if, for instance, the mtDNAs of two humans, however distant geographically, exhibit the same

mutation, they necessarily share a common ancestor in the maternal line.

Much of the difficulty lies in organizing those mutations, or genetic markers, in consistent categories called 'haplotypes' (from a Greek word meaning 'single'), which constitute an individual's genetic fingerprint. Similar haplotypes are then brought together in 'haplogroups,' each of which genetically identifies a particular ethnic group. Such genetic markers can then be used to establish a 'genetic distance' between two populations.

Identifying and making sense of the right genetic markers is not the only difficulty; dating their mutations remains a major challenge: on average, a marker of Y-DNA may undergo one mutation every 500 generations, but sudden changes caused by special circumstances can never be ruled out. Genetics, therefore, needs the inputs from palaeontology and archaeology, among other disciplines, to confirm its historical conclusions.

India's Case

Since the 1990s, there have been numerous genetic studies of Indian populations, often reaching apparently divergent conclusions. There are three reasons for this: (1) the Indian region happens to be one of the most diverse and complex in the world, which makes it difficult to interpret the data; (2) early studies relied on too limited samples, of the order of a few dozens, when hundreds or ideally thousands of samples are required for some statistical reliability; (3) some of the early studies fell into the old trap of trying to equate linguistic groups with distinct ethnic entities — a relic of the nineteenth-century erroneous identification between language and race; as a result, a genetic connection between North Indians and Central Asians was automatically taken to confirm an Aryan invasion in the second millennium BCE, disregarding a number of alternative explanations⁴.

More recent studies, using larger samples and much refined methods of analysis, both at the conceptual level and in the laboratory, have reached very different

conclusions (interestingly, some of their authors had earlier gone along with the old Aryan paradigm)". We will summarize here the chief results of nine studies from various Western and Indian Universities, most of them conducted by international teams of biologists, and more than half of them in the last three years. Since these papers are complex and technical, what follows is, necessarily, highly simplified and represents only a small part of their content.

The first such study dates back to 1999 and was conducted by the Estonian biologist Toomas Kivisild, a pioneer in the field, with fourteen co-authors from various nationalities (including M.J. Bamshad)¹⁰. It relied on 550 samples of mtDNA and identified a haplogroup called 'U' as indicating a deep connection between Indian and Western-Eurasian populations. However, the authors opted for a very remote separation of the two branches and rather than a recent population movement towards India; in fact, "the subcontinent served as a pathway for eastward migration of modern humans" from Africa, some 40,000 years ago: "We found an extensive deep late Pleistocene genetic link between contemporary Europeans and Indians, provided by the mtDNA haplogroup U, which encompasses roughly a fifth of mtDNA lineages of both populations. Our estimate for this split [between Europeans and Indians] is close to the suggested time for the peopling of Asia and the first expansion of anatomically modern humans in Eurasia and likely pre-dates their spread to Europe."

In other words, the timescale posited by the Aryan invasion/migration framework is inadequate, and the genetic affinity between the Indian subcontinent and Europe "should not be interpreted in terms of a recent admixture of western Caucasoids"¹¹ with Indians caused by a putative Indo-Aryan invasion 3,000–4,000 years BP.¹²

The second study was published just a month later. Authored by U.S. biological anthropologist Todd R. Disotell¹³, it dealt with the first migration of modern man from Africa towards Asia, and found that migrations into India "did occur, but rarely from western Eurasian populations." Disotell made observations very similar to

those of the preceding paper: "The supposed Aryan invasion of India 3,000–4,000 years before present therefore did not make a major splash in the Indian gene pool. This is especially counter-indicated by the presence of equal, though very low, frequencies of the western Eurasian mtDNA types in both southern and northern India. Thus, the 'Caucasoid' features of south Asians may best be considered 'pre-Caucasoid' — that is, part of a diverse north or north-east African gene pool that yielded separate origins for western Eurasian and southern Asian populations over 50,000 years ago."

Here again, the Eurasian connection is therefore traced to the original migration out of Africa. On the genetic level, "the supposed Aryan invasion of India 3000–4000 years ago was much less significant than is generally believed."

A year later, thirteen India scientists led by Susanta Roychoudhury studied 644 samples of mtDNA from some ten Indian ethnic groups, especially from the East and South¹⁴. They found "a fundamental unity of mtDNA lineages in India, in spite of the extensive cultural and linguistic diversity," pointing to "a relatively small founding group of females in India." Significantly, "most of the mtDNA diversity observed in Indian populations is between individuals within populations; there is no significant structuring of haplotype diversity by socio-religious affiliation, geographical location of habitat or linguistic affiliation." That is a crucial observation, which later studies will endorse: on the maternal side at least, there is no such thing as a 'Hindu' or 'Muslim' genetic identity, nor even a high- or low-caste one, a North- or South-Indian one — hence the expressive title of the study: "Fundamental Genomic Unity of Ethnic India is Revealed by Analysis of Mitochondrial DNA."

The authors also noted that haplogroup 'U,' already noted by Kivisild *et al.* year as being common to North Indian and 'Caucasoid' populations, was found in tribes of eastern India such as the Lodhas and Santals, which would not be the case if it had been introduced through Indo-Aryans. Such is also the case of the haplogroup 'M,' another marker frequently mentioned in the early literature

as an evidence for the invasion: in reality, "we have now shown that indeed haplogroup M occurs with a high frequency, averaging about 60%, across most Indian population groups, irrespective of geographical location of habitat. We have also shown that the tribal populations have higher frequencies of haplogroup M than caste populations."

Also in 2000, twenty authors headed by Kivisild contributed a chapter to a book on the 'archaeogenetics' of Europe¹¹. They first stressed the importance of the mtDNA haplogroup 'M' common to India (with a frequency of 60%), Central and Eastern Asia (40% on average), and even to American Indians; however, this frequency drops to 0.6% in Europe, which is "inconsistent with the 'general Caucasoidness' of Indians." This shows, once again, that "the Indian maternal gene pool has come largely through an autochthonous history since the Late Pleistocene." The authors then studied the 'U' haplogroup, finding its frequency to be 13% in India, almost 14% in North-West Africa, and 24% from Europe to Anatolia; but, in their opinion, "Indian and western Eurasian haplogroup U varieties differ profoundly; the split has occurred about as early as the split between the Indian and eastern Asian haplogroup M varieties. The data show that both M and U exhibited an expansion phase some 50,000 years ago, which should have happened after the corresponding splits." In other words, there is a genetic connection between India and Europe, but a far more ancient one than was thought.

Another important point is that looking at mtDNA as a whole, "even the high castes share more than 80 per cent of their maternal lineages with the lower castes and tribals"; this obviously runs counter to the invasionist thesis. Taking all aspects into consideration, the authors conclude: "We believe that there are now enough reasons not only to question a 'recent Indo-Aryan invasion' into India some 4000 BP, but alternatively to consider India as a part of the common gene pool ancestral to the diversity of human maternal lineages in Europe." Mark the word 'ancestral'.

After a gap of three years, Kivisild directed two fresh studies. The first, with nine colleagues, dealt with the origin

of languages and agriculture in India¹². Those biologists stressed India's genetic complexity and antiquity, since "present-day Indians [possess] at least 90 per cent of what we think of as autochthonous Upper Palaeolithic maternal lineages." They also observed that "the Indian mtDNA tree in general [is] not subdivided according to linguistic (Indo-European, Dravidian) or caste affiliations," which again demonstrates the old error of conflating language and race or ethnic group. Then, in a new development, they punched holes in the methodology followed by studies basing themselves on the Y-DNA (the paternal line) to establish the Aryan invasion, and point out that if one were to extend their logic to populations of Eastern and Southern India, one would be led to an exactly opposite result: "the straightforward suggestion would be that both Neolithic (agriculture) and Indo-European languages arose in India and from there, spread to Europe." The authors do not defend this thesis, but simply guard against 'misleading interpretations' based on limited samples and faulty methodology.

The second study of 2003, a particularly detailed one dealing with the genetic heritage of India's earliest settlers, had seventeen co-authors with Kivisild (including L. Cavalli-Sforza and P.A. Underhill), and relied on nearly a thousand samples from the subcontinent, including two Dravidian-speaking tribes from Andhra Pradesh¹³. Among other important findings, it stressed that the Y-DNA haplogroup 'M17,' regarded till recently as a marker of the Aryan invasion, and indeed frequent in Central Asia, is equally found in the two tribes under consideration, which is inconsistent with the invasionist framework. Moreover, one of the two tribes, the Chenchus, is genetically close to several castes, so that there is a "lack of clear distinction between Indian castes and tribes," a fact that can hardly be overemphasized.

This also emerges from a diagram of genetic distances between eight Indian and seven Eurasian populations, distances calculate on the basis of 16 Y-DNA haplogroups (Fig. 1). The diagram challenges many common assumptions: as just mentioned, five castes are grouped with the Chenchus; another tribe, the Lambadis (probably

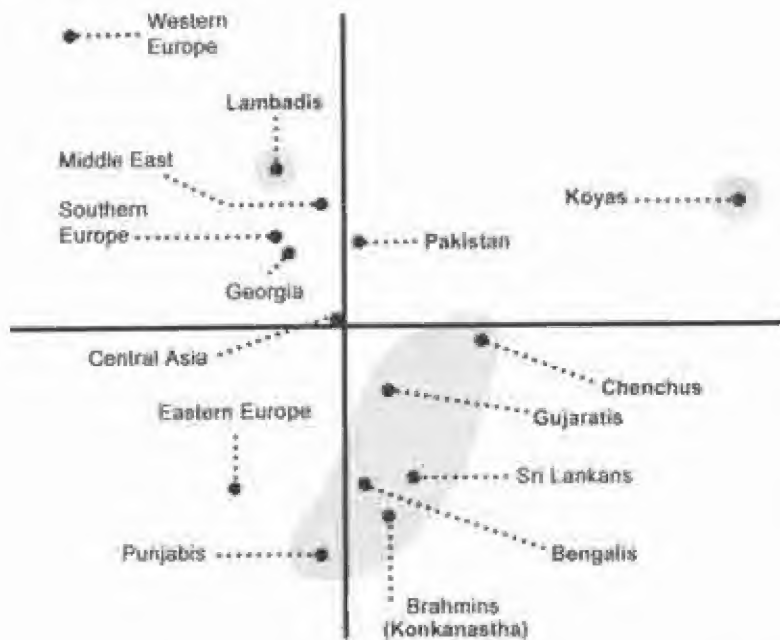


Fig. 1: Genetic distances between eight Indian and seven western Eurasian populations calculated for 16 Y-DNA haplogroups (adapted from T. Kivisild *et al.*, 'The Genetic Heritage of the earliest settlers persists both in Indian tribal and caste populations')

of Rajasthani origin), is stuck between Western Europe and the Middle East; Bengalis of various castes are close to Mumbai Brahmins, and Punjabis (whom one would have thought to be closest to the mythical 'Aryans') are as far away as possible from Central Asia! It is clear that no simple framework can account for such complexity, least of all the Aryan invasion/migration framework.

The next year, Man Metspalu and fifteen co-authors analyzed 796 Indian (including both tribal and caste populations from different parts of India) and 436 Iranian mtDNAs²⁸. Of relevance here is the following observation, which once again highlights the pitfalls of any facile ethnic-linguistic equation: "Language families present today in India, such as Indo-European, Dravidic and Austro-Asiatic, are all much younger than the majority of indigenous mtDNA lineages found among their present-day speakers at high frequencies. It would make it highly speculative to infer, from the extant mtDNA pools of their speakers, whether one of the above-listed linguistically defined group in India should be considered more 'autochthonous' than any other in respect of its presence in the subcontinent."

We finally jump to 2006 and end with two studies. The first was headed by Indian biologist Sanghamitra Sengupta and involved fourteen other co-authors, including L. Cavalli-Sforza, Partha P. Majumder, and P.A. Underhill²⁹. Based on 728 samples covering 36 Indian populations, it announced in its very title how its findings revealed a "Minor Genetic Influence of Central Asian Pastoralists," i.e. of the mythical Indo-Aryans, and stated its general agreement with the previous study. For instance, the authors rejected the identification of some Y-DNA genetic markers with an "Indo-European expansion," an identification they called "convenient but incorrect ... overly simplistic." To them, the subcontinent's genetic landscape was formed much earlier than the dates proposed for an Indo-Aryan immigration: "The influence of Central Asia on the pre-existing gene pool was minor. ... There is no evidence whatsoever to conclude that Central Asia has been necessarily the recent donor and not the receptor of the R1a lineages." This is also highly suggestive (the R1a lineages being a different way to denote the haplogroup M17).

Finally, and significantly, this study indirectly rejected a 'Dravidian' authorship of the Indus-Sarasvati civilization, since it noted, "Our data are also more consistent with a peninsular origin of Dravidian speakers than a source with proximity to the Indus...." They found, in conclusion, "overwhelming support for an Indian origin of Dravidian speakers."

Another Indian biologist, Sanghamitra Sahoo, headed eleven colleagues, including T. Kivisild and V.K. Kashyap, for a study of the Y-DNA of 936 samples covering 77 Indian populations, 32 of them tribes¹⁸. The authors left no room for doubt: "The sharing of some Y-chromosomal haplogroups between Indian and Central Asian populations is most parsimoniously explained by a deep, common ancestry between the two regions, with diffusion of some Indian-specific lineages northward."

So the southward gene flow that had been imprinted on our minds for two centuries was wrong, after all: the flow was out of, not into, India. The authors continue: "The Y-chromosomal data consistently suggest a largely South Asian origin for Indian caste communities and therefore argue against any major influx, from regions north and west of India, of people associated either with the development of agriculture or the spread of the Indo-Aryan language family."

The last of the two rejected associations is that of the Indo-Aryan expansion; the first, that of the spread of agriculture, is the well-known thesis of Colin Renfrew¹⁹, which traces Indo-European origins to the beginnings of agriculture in Anatolia, and sees Indo-Europeans entering India around 9000 BP, along with agriculture. Sanghamitra Sahoo *et al.* see no evidence of this in the genetic record.

The same data allow the authors to construct an eloquent table of genetic distances between several populations, based on Y-haplogroups (Fig. 2). We learn from it, for instance, that "the caste populations of 'north' and 'south' India are not particularly more closely related to each other (average F_{st} value = 0.07) than they are to the tribal groups (average F_{st} value = 0.06)," an important confirmation of earlier studies. In particular, "Southern castes and tribals are very similar to each other in their Y-chromosomal haplogroup compositions." As a result, "it was not possible to confirm any of the purported differentiations between the caste and tribal pools," a momentous conclusion that directly clashes with the Aryan paradigm, which imagined Indian tribes as *adivasis* and the caste Hindus as descendants of Indo-Aryans invaders or immigrants. In reality, we have no way, today, to determine who in India is an "*adi-vasi*," but enough data to reject this label as misleading and unnecessarily divisive.

	North castes	South castes	Reduced tribes	Northeast tribes	Turkey	Central Asia	Mongols/ Buryats	Southeast Asia	Iran	Iraq	East Europe	Russia	West Europe	Ethiopia
North castes	0.00													
South castes	0.07	0.00												
Reduced tribes	0.06	0.05	0.00											
Northeast cast tribes	0.21	0.20	0.19	0.00										
Turkey	0.11	0.14	0.13	0.21	0.00									
Central Asia	0.07	0.12	0.10	0.19	0.05	0.00								
Mongols/Buryats	0.26	0.27	0.26	0.32	0.21	0.12	0.00							
Southeast Asia	0.26	0.27	0.26	0.21	0.22	0.19	0.30	0.00						
Iran	0.09	0.12	0.11	0.22	0.01	0.06	0.24	0.24	0.00					
Iraq	0.16	0.19	0.17	0.26	0.04	0.10	0.27	0.27	0.02	0.00				
East Europe	0.08	0.23	0.19	0.33	0.16	0.11	0.34	0.34	0.18	0.23	0.00			
Russia	0.08	0.20	0.16	0.29	0.11	0.06	0.28	0.30	0.13	0.18	0.03	0.00		
West Europe	0.26	0.29	0.25	0.35	0.14	0.17	0.36	0.36	0.22	0.23	0.28	0.19	0.00	
Ethiopia	0.31	0.33	0.32	0.39	0.21	0.27	0.40	0.39	0.21	0.24	0.40	0.37	0.42	0.00

Fig. 2: Genetic distances populations estimated from Y- haplogroup frequencies (from Sanghamitra Sahoo *et al.*, "A prehistory of Indian chromosomes: Evaluating demic diffusion scenarios"

Conclusions

It is, of course, still possible to find genetic studies trying to interpret differences between North and South Indians or higher and lower castes within the invasionist framework, but that is simply because they take it for granted in the first place. None of the nine major studies quoted above lends any support to it, and none proposes to define a demarcation line between tribe and caste. The overall picture emerging from these studies is, first, an unequivocal rejection of a 3500 BP arrival of a 'Caucasoid' or Central Asian gene pool. Just as the imaginary Aryan invasion/migration left no trace in Indian literature, in the archaeological and the anthropological record, it is invisible at the genetic level. The agreement between these different fields is remarkable by any standard, and offers hope for a grand synthesis in the near future, which will also integrate agriculture and linguistics.

Secondly, they account for India's considerable genetic diversity by using a time-scale not of a few millennia, but of 40,000 or 50,000 years. In fact, several experts, such as Lluís Quintana-Murci²⁰, Vincent Macaulay²¹, Stephen Oppenheimer²², Michael Petraglia²³, and their associates, have in the last few years proposed that when *Homo sapiens* first migrated out of Africa, he first reached South-West Asia around 75,000 BP, and from here, went on to other parts of the world. In simple terms, except for Africans, all humans have ancestors in the North-West of the Indian peninsula. In particular, one migration started around 50,000 BP towards the Middle East and Western Europe: "indeed, nearly all Europeans — and by extension, many Americans — can trace their ancestors to only four mtDNA lines, which appeared between 10,000 and 50,000 years ago and originated from South Asia."²⁴

Oppenheimer, a leading advocate of this scenario, summarizes it in these words: "For me and for Toomas Kivisild, South Asia is logically the ultimate origin of M17 and his ancestors; and sure enough we find the highest rates and greatest diversity of the M17 line in Pakistan, India, and eastern Iran, and low rates in the Caucasus. M17 is

not only more diverse in South Asia than in Central Asia, but diversity characterizes its presence in isolated tribal groups in the south, thus undermining any theory of M17 as a marker of a 'male Aryan invasion' of India. One average estimate for the origin of this line in India is as much as 51,000 years. All this suggests that M17 could have found his way initially from India or Pakistan, through Kashmir, then via Central Asia and Russia, before finally coming into Europe."²⁵

We will not call it, of course, an "Indian invasion" of Europe; in simple terms, India acted "as an incubator of early genetic differentiation of modern humans moving out of Africa."²⁶

Genetics is a fast-evolving discipline, and the studies quoted above are certainly not the last word; but they have laid the basis for a wholly different perspective of Indian populations, and it is most unlikely that we will have to abandon it to return to the crude racial nineteenth-century fallacies of Aryan invaders and Dravidian autochthons. Neither have any reality in genetic terms, just as they have no reality in archaeological or cultural terms. In this sense, genetics is joining other disciplines in helping to clean the cobwebs of colonial historiography. If some have a vested interest in patching together the said cobwebs so they may keep cluttering our history textbooks, they are only delaying the inevitable.

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On Perceiving Aryan Migrations in Vedic Ritual Texts

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Vedicists have generally agreed in the last 150 years that the vast corpus of extant Vedic literature, comprising of several hundred texts, is completely silent on Aryan immigrations from Central Asia into India. But, in a lecture delivered on 11 October 1999 at the Jawaharlal Nehru University (New Delhi), historian Romila Thapar (1999) made a revisionist claim:

"...and later on, the Śrauta Sutra of Baudhayana refers to the Parāśus and the arattas who stayed behind and others who moved eastwards to the middle Ganges valley and the places equivalent such as the Kasi, the Videhas and the Kuru Pañcalas, and so on. In fact, when one looks for them, there are evidence for migration."

Another historian of ancient India, Ram Sharan Sharma considers this passage as an important piece of evidence in favor of the Aryan Migration Theory (AMT). He writes (Sharma 1999:87-89):

"More importantly, Witzel produces a passage from the Baudhayana Śrautasūtra which contains 'the most explicit statement of immigration into the Subcontinent'. This passage contains a

dialogue between Pururava and Urvasi which refers to horses, chariot parts, 100 houses and 100 jars of ghee.

Towards the end, it speaks of the birth of their sons Ayu and Amavasu, who were asked by their parents, to go out. 'Ayu went eastward. His people are the Kuru-Pañcalas and the Kasi-Videhas. This is the Ayava kin group. Amavasu stayed in the west. His people are the Gandharas, the Parsavas and the Arattas. This is the Amavasava kin group."

Sharma is so confident of the 'evidence' of the AMT produced by Witzel that he even goes to the extent of correlating these two groups with various pottery types attested in the archaeological record (ibid, p. 89). It is quite apparent that all these claims of alleged Vedic literary evidence for an Indo-Aryan immigration into the Indian subcontinent are informed by the following passage written by a Harvard philologist (Witzel 1995:320-321):

"Taking a look at the data relating to the immigration of the Indo-Aryans into South Asia, one is stuck by the number of vague reminiscences

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of foreign localities and tribes in the Rgveda, in spite repeated assertions to the contrary in the secondary literature. Then, there is the following direct statement contained in (the admittedly much later) BSS (=Baudhayana Shrauta Sutra) 18.44:397.9 sqq which has once again been overlooked, not having been translated yet: "Ayu went eastwards. His (people) are the Kuru Panchala and the Kasi-Videha. This is the Ayava (migration). (His other people) stayed at home. His people are the Gandhari, Parsu and Aratta. This is the Amavasava (group)" (Witzel 1989a: 235)."

That the above passage of the Baudhayana Srautasutra (henceforth 'BSS') is the only 'direct' evidence for an Indo-Aryan immigration into India is clarified by Witzel in the same article later (p. 321). The reference (Witzel 1989a: 235) at the end of the above citation pertains to an earlier article by Witzel, where he has elaborated it further (Witzel 1989: 235):

"In the case of ancient N. India, we do not know anything about the immigration of various tribes and clans, except for a few elusive remarks in the RV (= Rigveda), SB (= Shatapatha Brahmana) or BSS (= Baudhayana Shrauta Sutra). This text retains at 18.44: 397.9 sqq. the most pregnant memory, perhaps, of an immigration of the Indo-Aryans into Northern India and of their split into two groups: *pran Ayuḥ pravavraja. Tasyaite Kuru-Pancalah Kasi-Videha ity. Etad Ayavam pravrajam. Pratyān amavasas. Tasyaite Gandharvarayas Parsavo 'ratta ity. Etad Amavasavan.* "Ayu went eastwards. His (people) are the Kuru-Panchala and the Kasi Videha. This is the Ayava migration. (His other people) stayed at home in the West. His people are the Gandhari, Parsu and Aratta. This is the Amavasava (group)".

Finally, this mistranslation is found in an even older publication of Witzel (1987: 202) as well. This article intends to show how this Sutra passage actually says the

reverse of what Witzel intends to prove, because Witzel's translation is flawed. As an aside, a Czech scholar Václav Blazek (2002:216) relies on the mistranslation of the passage in Witzel (1995:320-321) to reinforce his conclusion that the Arattas were localized in the Helmand basin. Interestingly, in the 'Acknowledgements' section (p. 235) of the paper, Blazek mentions Witzel. Therefore, we can discount his interpretation as one that has no independent value due to it being dependent upon Witzel's erroneous arguments.

Grammatical Flaws in Witzel's Mis-translation of Baudhayana Srautasutra 18.44

In a review of Erdosy's volume where Witzel's article appeared, Koenraad Elst took issue with Witzel on the precise translation of the Sanskrit passage. He stated (Elst 1999:164-165):

"This passage consists of two halves in parallel, and it is unlikely that in such a construction, the subject of the second half would remain unexpressed, and that terms containing contrastive information (like "migration" as opposed to the alleged non-migration of the other group) would remain unexpressed, all left for future scholars to fill in. It is more likely that a non-contrastive term representing a subject indicated in both statements, is left unexpressed in the second: that exactly is the case with the verb *pravavraja* "he went", meaning "Ayu went" and "Amavasu went". Amavasu is the subject of the second statement, but Witzel spirits the subject away, leaving the statement subject-less, and turns it into a verb, "amā vasu", "stayed at home". In fact, the meaning of the sentence is really quite straightforward, and doesn't require supposing a lot of unexpressed subjects: "Ayu went east, his is the Yumuna-Ganga region", while "Amavasu went west, his is Afghanistan, Parshu and West Panjab". Though the then location of "Parshu" (Persia?) is hard to decide, it is definitely a western country, along with the two others named, western

from the viewpoint of a people settled near the Saraswati river in what is now Haryana. Far from attesting an eastward movement into India, this text actually speaks of a westward movement towards Central Asia, coupled with a symmetrical eastward movement from India's demographic centre around the Saraswati basin towards the Ganga basin."

Elst further commented (*ibid*):

"The fact that a world-class specialist has to content himself with a late text like the BSS, and that he has to twist its meaning this much in order to get an invasionist story out of it, suggests that harvesting invasionist information in the oldest literature is very difficult indeed. Witzel claims (*op. cit.*, p.320) that: 'Taking a look at the data relating to the immigration of Indo-Aryans into South Asia, one is struck by a number of vague reminiscences of foreign localities and tribes in the Rgveda, in spite [of] repeated assertions to the contrary in the secondary literature.' But after this promising start, he fails to quote even a single one of those 'vague reminiscences'."

If Elst's critique is correct, the solitary direct literary evidence cited by Witzel for the AMT gets annulled. Elst's revelation generated a very bitter controversy involving accusations of a personal nature. We need not detail these here as the controversy is documented in my earlier online article (Agarwal 2001). Dr. S. Kalyanaraman, referred the matter to Dr. George Cardona, an international authority in Sanskrit language and author of numerous definitive publications on Panini's grammar. Cardona clearly rejected Witzel's translation, and upheld the objections of Elst on the basis of rules of Sanskrit grammar. In a message posted on an internet discussion forum, he stated (Cardona 2000):

"The passage (from Baudha yana S'rautasu-tra), part of a version of the Puruṣaravas and Urva'sii legend concerns two children that Urva'sii bore and which were to attain their full life span, in

contrast with the previous ones she had put away. On p. 397, line 8, the text says: saayū.m caamaavasū.m ca janayāa.m cakaara 'she bore Saayu and Amaavasū.' Clearly, the following text concerns these two sons, and not one of them along with some vague people. Grammatical points also speak against Witzel's interpretation. First, if amaavasus is taken as amaa 'at home' followed by a form of vas, this causes problems: the imperfect third plural of vas (present vasati vasata.h vasanti etc.) would be avasan; the third plural aorist would be avaatsu.h. I have not had the chance to check Witzel's article again directly, so I cannot say what he says about a purported verb form (a)vasu.h. It is possible, however, that Elst has misunderstood Witzel and that the latter did not mean vasu as a verb form per se.

Instead, he may have taken amaa-vasu.h as the nominative singular of a compound amaa-vasu-meaning literally 'stay-at-home', with -vas-u-being a derivate in -u- from -vas. In this case, there is still what Elst points out: an abrupt elliptic syntax that is a mismatch with the earlier mention of Amaavasū along with Aayu. Further, tasya can only be genitive singular and, in accordance with usual Vedic (and later) syntax, should have as antecedent the closest earlier nominal; if we take the text as referring to Amaavasū, all is in order: tasya (sc. Amaavasū.h). Finally, the taddhitaanta derivatives aayava and aamaavasava then are correctly parallels to the terms aayu and amaavasū. In sum, everything fits grammatically and thematically if we straightforwardly view the text as concerning the wanderings of two sons of Urva'sii and the people associated with them. There is certainly no good way of having this refer to a people that remained in the west."

The noted archaeologist B. B. Lal (Lal 2005:85-88) has also stated clearly that Witzel's translation is untenable and is a willful distortion of Vedic texts to prove the non-

proven Aryan migration theory (AMT). Lal's criticism is along the same lines as that of Elst.

Translations of BSS 18:44 by other Scholars in English, German and Dutch:

Let us consider the few publications where the relevant Baudhayana Śrautasūtra (BSS) passage has actually been studied, or has been translated by other scholars.

Willem Caland's Dutch translation: It is Caland who first published the Baudhayana Śrautasūtra from manuscripts (Caland 1903-1913). In an obscure study of the Urvashi legend written in Dutch, he focuses on the version found in Baudhayana Śrautasūtra 18.44-45 and translates the relevant sentences of text (Caland 1903: 58). Translated into English, the relevant sentences in the Dutch original read:

"To the East went Ayus; from him descend the Kurus, Pancalas, Kasis and Videhas. These are the peoples which originated as a consequence of Ayus's going forth. To the West went Amavasus; from him descend the Gandharis, the Sparsus and the Arattas. These are the peoples which originated as a consequence of Amavasus's going forth."

The text, as reconstituted by Caland (and also accepted by Kashikar – see below) reads 'Sparsus', which apparently stands for the peoples who are known as 'Parshus' elsewhere in the Vedic literature, and are often identified as the ancestors of Persians (or even of Pashtuns). Clearly, Caland interpreted this sūtra passage to mean that from a central region, the Arattas, Gandharis and Parsus migrated west, while the Kasi-Videhas and Kuru-Pancalas migrated east. Combined with the testimony of the Śatapatha Brahmana (see below), the implication of this version in the Baudhayana Śrautasūtra, narrated in the context of the *agnyadhya* rite, is that the two outward migrations took place from the central region watered by the Sarasvatī. Interestingly, the volume of Caland's *Kleine Schriften* have been edited as by none other than Michael Witzel (1990).

Therefore, it is all the more surprising that in this entire controversy, Witzel did not allude to Caland's translation of the passage at all!

C.G. Kashikar's English translation: Very recently, Kashikar (2003: 1235) has translated the relevant sentences of the text as follows:

"Ayu moved towards the east. Kuru-Pancala and Kasi-Videha were his regions. This is the realm of Ayu. Amavasus proceeded towards the west. The Gandharis, Sparsus and Arattas were his regions. This is the realm of Amavasus."

D.S. Trivedi's English translation: In an article (Trivedi 1938-39) dealing specifically with the homeland of Aryans, he titles the concluding section as "Aryans went abroad from India". He commences this section with the following words (ibid, p. 68):

"The Kalpasūtra asserts that Puruvas had two sons by Urvashi—Ayus and Amavasus. Ayu went eastwards and founded Kuru-Pancala and Kasi-Videha nations, while Amavasus went westwards and founded Gandhara, Sparsava and Aratta."

In a footnote, the author gives the source as 'Baudhayana Śrautasūtra XVIII. 35-51'. The address is wrong, but it is clear that Baudhayana Śrautasūtra 18.44 is meant. Therefore, Trivedi also takes the passage to mean that Amavasus migrated westwards, rather than staying where he was as Witzel would translate it.

Toshifumi Goto's German Translation: In his recent study (Goto 2000) of some parallel Vedic passages dealing with the *agnyadhya* rite, Toshifumi Goto translates the relevant Sūtra passage into German (p. 101 sqq.). Loosely translated into English, this reads:

"From there, Ayu wandered Eastwards. To him belong (the groups called) 'Kurus and Panchalas, Kasis and Videhas' (note 87). They are the branches/leading away (note 88) originating from

Ayu. From there, Amavasū turned westwards (wandered forth). To him belong (the groups called) 'Gandharis, Parsus (note 89) Arattas'. They are the branches/leading away originating from Amavasū (note 90)."

[90]: It appears that the notion of 'Ayu' as an normal adjectival sense 'living', 'agile' underlies this name. Correspondingly, Krick 214 interprets Amavasū as—"Westwards [travelled] A. (or: he stayed back in the west in his home, because his name says—"one who has his goods at home")".

Notes 87-89 in the German original are irrelevant to this present discussion and are therefore left untranslated here. We will discuss the views of Hertha Krick referred to by Goto in greater detail later. What is important here is that four scholars have translated the disputed passage in the same manner as Elst, and differently from Witzel.

Pururava-Uruvasi (or Uruvasi) Narratives in Vedic Texts, a Conspectus:

The Pururava-Uruvasi legend is found in numerous Vedic and non-Vedic texts. In the former, the couple and their son Ayu are related to the *agnyadhya* rite. Some passages in Vedic texts that allude to this rite/tale are – Rigveda 10.95; Kathaka Samhita 26.7 etc.; Agnyadhya Brahmana (in the surviving portions of the Brahmana of Katha Sakha), etc.; Maitrayani Samhita 1.2.7; 3.9.5; Vajrasneyi (Madhyandina) Samhita 5.2; Satapatha Brahmana (Madhyandina) 11.5.1.1; Baudhayana Srautasutra 18.44-45; Vadhula Anvakhya 1.1-2, etc. Note that the Kathaka Brahmana exists only in short fragments, most of which have been collected together by Suryakanta (1981), Rosenfield (2004) and also by some other earlier scholars. The *agnyadhya brahmanam* portion of the Kathaka Brahmana survives (and is included in Suryakanta's collection), but it does not shed any light on the question at hand. Many of the above textual references, as well as those in Srautasutras (not listed above), do not throw much light on the historical aspects of the legend. Several passages cursorily mention Uruvasi as mother,

Pururava as father, Ayu (equated to Agni) as their son and ghee as (Pururava's) seed in a symbolic manner in connection with various rites (Taittiriya Samhita 1.3.7.1; 6.3.5.3; Kathaka Samhita 3.4; Kapisthala Samhita 2.11; 41.5; Kanva Samhita 5.2; Maitrayani Samhita 2.8.10). Elsewhere, Uruvasi is enumerated as an *apsara* and prayers are directed towards her for protection (Kathaka Samhita 17.9; Kapisthala Samhita 26.8, Taittiriya Samhita 4.4.3.2; Maitrayani Samhita 2.8.10). At least in one ritual context, Uruvasi is taken to represent all Devis (Taittiriya Samhita 1.2.5.2). Kathaka Samhita 8.10 narrates the tale in brief and may be paraphrased as:

"Uruvasi was the wife of Pururava. She left Pururava and returned to devas. Pururava prayed to devas for Uruvasi. Then, devas gave him a son named Ayu. At their bidding, Pururava fabricated aranis (fire stick and base used for the fire sacrifice) from the branches of a tree and rubbed them together. This generated fire, and Pururava's desire was fulfilled. He who establishes sacrificial fires this attains progeny, animals etc."

Thus, this passage also equates Ayu with Agni. In addition, some passages of Srautasutras mention them in the context of *caturmasya* rites (E.g., *Katyayana Srautasutra* 5.1.24-25).

The texts that are of most use for the present purpose are Rigveda 10.95, Satapatha Brahmana 11.5.1; Baudhayana Srautasutra 18.44-45 and Vadhula Anvakhya 1.1-2. Dozens of published secondary studies examine the legend from the data scattered in Vedic, Puranic and Kavya texts. We need not dwell upon the versions available in Brhaddevata, Sarvanukramam, Puranas, etc., here because they are either too late or do not shed any additional light on our problem. A survey of a few of these is given in Shridhar (2001: 311-345). Most of these studies do take into account the information contained in Rigveda and Satapatha Brahmana. Very few however analyze the information in the Baudhayana Srautasutra. Even Volume 1.1 of the Sratukosa (Dandekar 1958), which studies the *agnyadhya* rite in detail with a special emphasis on the

Baudhayana Śrautasūtra, ignores these sections. To my knowledge, only Willem Caland (1903), Hertha Krick (1983) and Yasuke Ikari (1998) have studied the relevant sections of the Baudhayana Śrautasūtra in detail.

Kuruksetra in Baudhayana Śrautasūtra 18:45:

A very strong piece of evidence for deciding the correct translation of Baudhayana Śrautasūtra 18:44 is the passage that occurs right after it, i.e., Baudhayana Śrautasūtra 18:45. I am reproducing the translation of Kashikar (2003:1235) with minor modifications that do not affect the issue at hand:

"[...] After having returned from the *Asvattha* (the king) saw her (Urvashi). The sons approached her and said, "Do thou take us there where thou are going. We are strong. Thou hast put our father, one of you two, to grief."¹²

She said, "O sons, I have given birth to you together. (Therefore) I stay here for three nights. Let not the word of the *brahmana* be untrue." The king wearing the inner garment lived with her for three nights. He shed semen virile unto her.

She said, "What is to be done?" "What to do?", the king responded. She said, "Do thou fetch a new pitcher?" She disposed it into it. In Kurukshetra, there were ponds called Bisavati. The northern-most among them created gold. She put it (the semen) into it (the pond). From it (the banks of the pond) came out the *Asvattha* tree surrounded by *Sami*. It was *Asvattha* because of the virile semen, it was *Sami* by reason of the womb. Such is the creation of (*Asvattha* tree) born over *Sami*. This is its source.

It is indeed said, "Gods attained heaven through the entire sacrifice."¹³

When the sacrifice came down to man from the gods, it came down upon the *Asvattha* (tree). They prepared the churning woods out of it; it is the

sacrifice. Indeed, whichever may the *Asvattha* be, it should be deemed, as growing on the *Sami* (tree). [...]

¹² Doubtful word and meaning.

¹³ Taittiriya Samhita 1.7.1.3".

From this text, it is clear that Urvashi, Pururava and their two sons were present in Kurukshetra in their very lifetimes. There is no evidence that Ayu's descendants traveled all the way from Afghanistan to Haryana (where Kurukshetra is located) subsequently, nor is there any evidence that she took her sons from Kurukshetra to Afghanistan after disposing off the pitcher. Therefore, the disputed passage BSS 18:45 would imply that the descendants of Amavasu, i.e., Arattas, Parsus and Gandharris migrated *westwards* from the Kurukshetra region. Note that in Taittiriya Aranyaka 5.1.1, the Kurukshetra region is said to be bounded by Turghna (=Srughna or the modern village of Sugh in the Sirhind district of Punjab) in the north, by Khandava in the south (corresponding roughly to Delhi and Mewat regions), Maru (=desert) in the west, and "Parin" (?) in the east. This roughly corresponds to the modern state of Haryana in India.

Satapatha Brahmana IX.5.1 and Pururava-Urvashi Narrative

The Satapatha Brahmana XI.5.1 is very clear that the wanderings of Pururava, the re-union with Urvashi (and from context, their initial cohabitation) were all in the Kurukshetra region (and not in W. Punjab or anywhere further west). Another point to note is that Pururava is said to be the son of Ila, a deity again closely linked to the Kurukshetra region and Sarasvati. Let me reproduce the relevant passages from the Satapatha Brahmana XI.5.1, as translated by Julius Eggeling [1900(1963): 68-74]:

"Then, indeed, she vanished: 'Here I am back,' he said, and lo! She had vanished. Wailing with sorrow he wandered all over Kurukshetra. Now there is a lotus-lake there, called Anyatahplaksha: He walked along its bank; and there nymphs were swimming about in the shape of swans. XI.5.1.4

At this stage, the text reproduces some verses from Rgveda X.95, which contain the Pururava-Urvasi dialog, ending with Rgveda X.95.16. The narrative continues:

"This discourse in fifteen verses has been handed down by the Bahvrikas. Then her heart took pity on him. XI.5.1.10

She said, 'Come here the last night of the year from now; then shalt thou lie with me for one night, and then this son of thine will have been born.' He came there on the last night of the year, and lo, there stood a golden palace! They then said to him only this (word), 'Enter!' and then they bade her go to him. XI.5.1.11

She then said, 'Tomorrow morning the Gandharvas will grant thee a boon, and thou must make thy choice.' He said, 'Choose thou for me!' - She replied, 'Say, Let me be one of yourselves!' In the morning the Gandharvas granted him a boon; and he said, 'Let me be one of yourselves!' XI.5.1.12

They said, 'Surely, there is not among men that holy form of fire by sacrificing wherewith one would become one of ourselves.' They put fire into a pan, and gave it to him saying, 'By sacrificing therewith thou shalt become one of ourselves.' He took it (the fire) and his boy, and went on his way home. He then deposited the fire in the forest and went to the village with the boy alone. [He came back and thought] 'Here I am back;' and lo! It had disappeared; what had been the fire was an Asvattha tree (ficus religiosa), and what had been the pan was the Sami tree (mimosa suma). He then returned to the Gandharvas. XI.5.1.13[...]"

The mention of a lotus pond at Kurukshetra in the Satapatha Brahmana needs to be noted by the reader because it is consistent with the information provided by Baudhayana Srautasutra 18.45, which also refers to the

presence of Pururava and Urvasi by a lotus pond surrounded by Peepul (Asvattha) trees in Kuruksetra, and performance of rituals at the site. It is clear then, that Urvasi and Pururava themselves were present in Kuruksetra for the birth of Ayu according to the author of both the Satapatha Brahmana and Baudhayana Srautasutra 18.44-45. In conclusion therefore, Ayu or his descendants did not migrate to India from Afghanistan according to these texts.

Vadhula Anvakhyaana Version of the Narrative

The relevant portion of the text has been published only recently, first by Y Ikari (1998:19-23), and more recently by Braj Bihari Chaubey (2001). Based on Ikari's text, Toshifumi Goto (2000) has studied the legend in detail, comparing it with parallel passages in Vedic texts, in particular Baudhayana Srautasutra 18.44-45. The Vadhula Anvakhyaana Brahmana 1.1-2 (Chaubey 2001: 34-35, 1-3 of *devanagari* text) does not add any additional geographical information except stating that Pururava and Urvasi traveled to Urvasi's father's home for the birth of their son Ayu. This might again be interpreted by Aryan invasionists as proof that Ayu was born in Afghanistan. They would argue that Urvasi was an *apsara*, and therefore, she belonged to the *gandharvas* who are sometimes placed in Afghanistan by scholars still believing in the Aryan Invasion Theory (AIT). For instance, Malati Shengde (1977: 111) suggests that the *gandharvas* were the priests of people who resided in the Kabul Valley. Such speculations however are very tentative and tenuous, and do not constitute evidence of any type. They certainly cannot over-ride rules of Sanskrit grammar in interpreting Sanskrit texts such as Baudhayana Srautasutra 18.44. Moreover, the Vadhula text does not mention the separation of Pururava and Urvasi. It does not mention Amavasu or his birth at all, and states instead that Pururava left the home of his in laws with his son Ayu, and with the knowledge of *yajna*. The section 1.1.2 of this text explicitly equates Ayu with Agni, that eats food for both humans and the Devas ("—*aayurasi iti jaatam abhimantrayate sa vai osha aayuh paurnuvasa ubhayeshaan devamanashyanaam*

annaado agnibhagavaan ubhayeshaam...). It also states explicitly that Urvasi was actually a human who had been given over to the *gandharvas*. So much for the Afghani provenance of Urvasi and Pururava!

Hertha Krick's study (Krick 1982) on the agnyadheya Rite:

Hertha Krick presents her translation, or rather an interpretation of Baudhayana Śrautasūtra 18.44 (p. 214) in her PhD thesis that was published posthumously (Krick 1982). She first suggests that the descendants of Amavasū migrated westwards, but then proposes an alternate interpretation that Amavasū stayed west in his home, and only Ayu migrated eastwards. Later on too, she refers (page 218-219) to her second interpretation that the descendants of Ayu migrated to Kurukṣetra region and thence to other parts of Madhyadesha where Vedic orthodoxy/orthopraxy was established eventually by Brahmins, whereas the Amavasūs stayed back in western regions of Gandhara, etc. She also links Ayu and his descendants with symbolism related to Moon and Soma, and reproduces passages from later Sanskrit texts on the progeny of Pururava and Urvashi. None of this really sheds light on our problem at hand. It should be noted that the entire work of Krick is written under the Aryan invasionist (AIT) paradigms. Her major argument for situating Urvasi in the Gandhara region is that Urvasi resided with sheep and goats and rearing of these animals was especially important for residents of Afghanistan and its adjoining areas! Parpola (1980:8) translates the relevant sentences from German,

"Urvasi calls them (pair of sheep) her children, and becomes desperate when they are robbed, while Pururavas boasts of having 'ascended the sky' through the recapture of the ram. This shows that the generative and fertility power of the royal family and thereby the whole kingdom was dependent upon these sheep. This component of the tale should be based upon the actual old customs and cultic conceptions of a country subsisting in sheep raising, such as Gandhara...(p. 160)".

But such an argument is not conclusive because sheep and goat herding have been important occupations not just in Afghanistan and North Western Frontier Province region of Pakistan, but also in much of Rajasthan, Punjab and parts of Haryana down to present times. Not surprisingly, scholars who still adhere to AIT and its euphemistic interpretations (such as Aryan migration theory) continue to torture Vedic texts and see 'evidence' for Indo-Aryan migrations into India. Therefore, Krick's interpretations have also found support in her obituary written by Asko Parpola, another scholar who till this day believes not just in one, but in multiple Aryan invasions of India. Parpola (1980:10) remarks sympathetically:

"Such feasts dedicated to *gandharvas* and *apsarases* have been celebrated at quite specific lotus ponds surrounded by holy fig trees in the Kurukṣetra. The analysis cited above suggests, however, that the original location of the legend was a country like Gandhara, where sheep-raising was the predominant form of economy. This eastward shift, which is in agreement with the model of the Aryan penetration into India, starting from the mountains of the northwest, is corroborated. Hertha Krick points out, also by the geneology of the peoples as given in the Baudhayana-Śrautasūtra (18, 44-45): while Amavasū stayed in the west (Gandhara), Ayu went to the east (Kurukṣetra)."

Likewise, in a later publication, Witzel (2001a) too draws solace from the fact that Krick interprets 'Amavasū' as one who 'keeps his goods at home', and 'Ayu', as 'active/ agile/alive'. According to Witzel, Krick and Parpola, BSS 18.44 designates the homeland of Gandharis, Parsas and Arattas as 'here' ('ama' in 'amavasū'). *Prima facie*, this suggestion is illogical, because the territory inhabited by these three groups of people is a vast swathe of land comprising a major portion of modern-day NWFP/ Baluchistan provinces of Pakistan, and much of Afghanistan. To denote such a vast swathe of territory by the word 'here', while contrasting it with supposed

migrations of Kurus and other Indian peoples from 'here' to 'there' (= northern India) is somewhat of a stretch. Muni Baudhayana (or whoever wrote BSS 18.44) was definitely a resident of northern India, and for him, Afghanistan and northwestern Pakistan would be 'there', and not 'here' or 'home' (which would be his region of northern India).

Now, in an online paper, Witzel (Witzel 2001: 16, fn. 45) tries to minimize the importance he had placed earlier on BSS 18.44 as the only important 'direct evidence' for an Indo-Aryan immigration. In this paper, Witzel refers to his earlier publication 'Witzel (1980)' as proof that Arattas were 'Arachosians' (= residents of Helmand Valley in S W Afghanistan). But when the present author checked this publication (Witzel 1980: fn. 3), it was found to place the Arattas in the Badakhshan area in extreme NE Afghanistan! In other words, Witzel now misquotes *his own* earlier publication incorrectly while defending his mistranslation!

Conclusion- Imposing Colonial Paradigms on Ancient Ritual Passages:

Rather than insisting on seeing evidence for 'movement' or 'migration' in the word 'Ayu', and correspondingly 'remaining in their home' in the word Amavasū, it is perhaps less tortuous to interpret this passage figuratively in a manner that is more consistent with the Indian tradition. How then do we interpret the Vedic narratives about the birth of Ayu and Amavasū? Tradition holds that the Kuru-Panchalas, and later the Kashi-Videhas conformed to Vedic orthopraxy (i.e., they performed fire sacrifices to the Devas) and were therefore 'alive'. On the other hand, the progeny of Amavasū did not sacrifice to the Devas and hoarded their wealth in their homes.

An over-arching theme in the versions of the Pururava-Urvastī legend in the Vedic texts is the *semi-divine origin* of the Vedic ritual. The *yajna* is said to have reached mankind through Pururava, who got it from semi-divine beings, the *gandharvas*, via the intervention of Urvastī, who herself was an *apsarā* and belonged to the *gandharvas*. Coupled with the Baudhayana Śrautasūtra 18.44-45 passage, we may interpret the names of Ayu and Amavasū

to mean that the former represents the mythical ancestor of peoples (Kuru-Panchalas and Kashi-Videhas) who are 'alive and bright', and 'vibrant' or 'moving' because they sacrificed to the Devas. Vadhula Anvakhyaṇa 1.1.1 explicitly declares that before the birth of Ayu, humans did not perform Yajna properly due to which they had developed only the trunk part of their body and not their limbs- "...*naanyaani kanti chanaanguani*..." In contrast, the Gandharis, Parsus and Arattas did not perform Vedic sacrifices for Devas and hoarded their 'possessions in their homes', due to which they were 'stationary' or 'dead' and 'devoid of light', like the '*amavasya*' or moonless night. This interpretation would be completely consistent with later traditions concerning the conformity to Vedic orthopraxy by the Kurus, Panchalas, Kashis and Videhas; and the lack of the same in the case of Arattas, Gandharis and Parsus. In 'modern idiom', the former group are progeny of 'fire' or 'light', and the latter are progeny of 'darkness' and 'death' from the perspective of Vedic orthopraxy.

Whatever be the ritual interpretation of this passage, there is no convincing way to uphold Witzel's mistranslation or over-interpretation of Baudhayana Śrautasūtra 18.44. One must be extremely wary of using at least the Vedic versions of this legend to construct real history of human migrations, otherwise we would have to deduce an outward from India towards Central Asia. There is absolutely no need to read modern and colonial Aryan invasion and migration theories into ancient ritual texts. Therefore, we may conclude there still exists *no Vedic evidence* for an Aryan immigration into India. All such attempts by Witzel (and following him R Thapar, and R S Sharma) must be considered as over-zealous misinterpretations eventually derived from colonial theories such as the Aryan invasion theory. Eminent historians must not fall into the trap of seeing 'evidence' for Aryan migrations or invasions in texts that are chronologically removed by a 1000 years from the period of these supposed demographic movements. Doing so is bad historiography and not just a case of "when one looks for them, there are evidence for migration" (Thapar 1999). The Vedic texts,

comprising of several thousand pages of printed texts, indeed do not have a single statement that may serve as literary evidence for AIT or AMT unless one wants to imagine evidence that does not exist.

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Excavations at Sanauli 2005-06: A Harappan Necropolis in the Upper Ganga-Yamuna Doab

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A news appeared on 8th July 2004 in a local daily, the *Dainik Jagaran*, about the chance discovery of some pottery vessels and human skeletal remains from an agricultural field at Sanauli (District Baghpat, U.P.). This prompted us to inspect the site. We found that the villagers had levelled an area of about 35 m (north-south) x 20 m (east-west) for agricultural purposes, unmindful of what archaeological treasure was hidden in the earth. The villagers would have continued the digging had we not arrived at the site in time. Meanwhile, the artifacts recovered from these casual diggings shown to the team included special and typical pottery vessels of the Harappan context, fragments of human skeletons, including those of a few skulls, fragments of burnt bricks, beads of semi-precious stones, and, most interestingly, a copper antenna sword, the last being identical with one of the Copper Hoard types. All these archaeological remains were indicative of the great potential of the site in terms of hitherto unknown aspects of the Harappan Civilization of the Yamuna basin, far from the Core Area of the Indus and the Saraswati basins (Fig. 1). There was, therefore, every reason to excavate the site properly as early as possible. As the land in the area is very fertile for agricultural produce, particularly sugarcane which is a cash crop, and

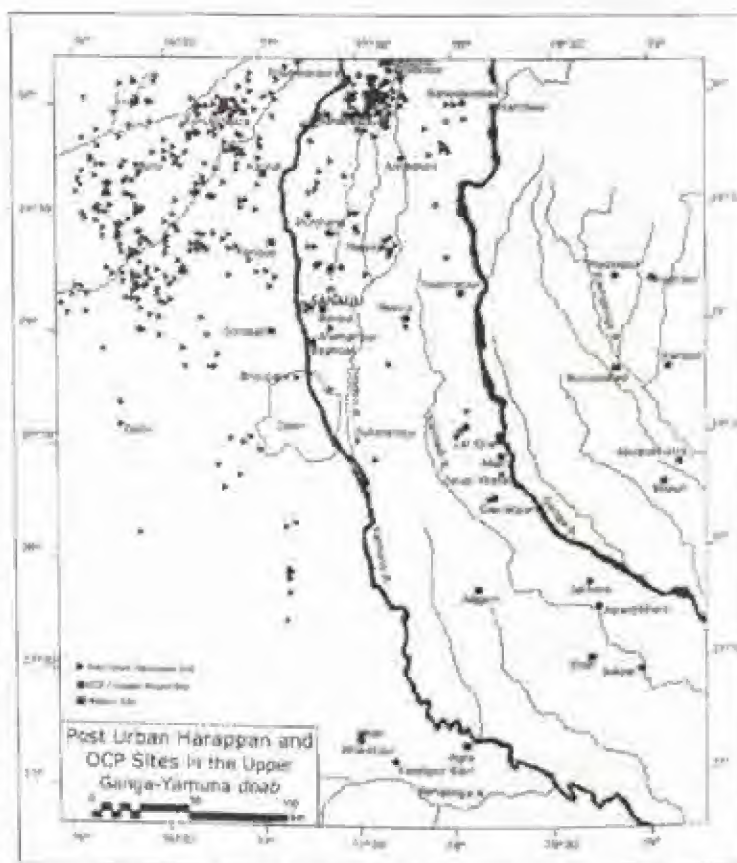


Fig. 1

*Archaeological Survey of India, New Delhi

villagers rotate the crops continuously, there was a lot of local pressure to leave the idea of excavating the site. However, the archaeological operations at the site commenced in August 2005 and continued till August 2006, i.e., for one full year covering two field-seasons. As a result, a large number of assorted relics, having immense and wide-ranging archaeological importance, were discovered and analyzed. Following is the Preliminary Report of our excavations.

The Site and its Environs

The full name of the village located adjacent to the site is Sadiqpur Sanauli (29°8'28" North; 77°13'1" East). However, the village is popularly known as Sanauli. It is located on the Barot-Chhaprauli road in Tehsil Barot, District Baghpat, western Uttar Pradesh, in the Yamuna basin with Hindon as its nearest tributary. At present, the River Yamuna flows at a distance of about 6 km west to the village. The present contours of the site and succession of soil deposits indicate that the river may have flowed closer to the site during third millennium BC. Presently, there is a big depression close to the excavated site, to its northwest, which originally was a big natural water reservoir. In local parlance, it is called *johad*. It is likely that the *johad* was an ox-bow lake left behind when river Yamuna shifted its course westwards. In any case, presence of a regular water source close to the cemetery is a common feature of nearly all ancient settlements.

Geologically, the soil composition of the area, including the site, comprises sand and alluvial deposit which is 1.20 m thick cover as measured from the present ground level. Below this, nearly 1 m thick deposit is of calcium carbonate or *chunam* nodules (locally called *bichchu kankars*). Further below it are river borne silt and clay deposits. The total of these three deposits comes to around 2.50 m upto which graves have been found, below that is barren.

This agricultural field, in which the site is located, is at a distance of approximately 300 m southeast of the modern village of Sanauli (Fig. 2). The total extent of the

burial site could not be assessed because of the standing crops of sugarcane all around the site throughout the year. There must have been a habitational site associated with the burial site, which also could not be located for the same reason. All such problems will have to be tackled in future when fieldwork is taken up.

The Excavations

The objectives of excavations at Sanauli were threefold: (1) to establish cultural context of the explored copper antenna sword which is a typical implement of the Copper Hoard assemblages, (2) to retrieve information pertaining to the Harappan cemetery and habitational site in the upper Ganga-Yamuna *doab*, and (3) to further understand nature and character of the Harappan settlement pattern in the region under reference.

With a view to carry out excavations, twenty trenches, each measuring 10 x 10 m, were laid in north-south direction (Pl.1). Of these trenches, all 60 quadrants were excavated to varying depths. So far, 116 graves have been excavated from different depths, the maximum depth being 2.40 m below present ground level. All the graves were found laid in northwest-southeast orientation as a rule, with head placed in the north, and legs towards the south direction. A majority of these burials (52 in number) are 'extended' with skeletal remains of the dead in them largely intact (Pl.2; Fig.3), lesser number of these (35) are 'secondary' yielding fragmentary bones. The smallest number (29) did not yield human bones, but only grave-goods, hence 'symbolic' in character. Based on stratigraphy, all these burials may be said to have been found in three successive levels – lower, middle and upper (Pl.3). At times, graves of relatively early levels have been found disturbed by those of the later levels. Evidence of animal sacrifice in some middle and upper levels burials has been observed.

Double Burial

A noteworthy discovery from the site was a double burial (Burial 27) from the middle levels (Pl.4). This burial

Sanauli 2004-06
Contour Plan

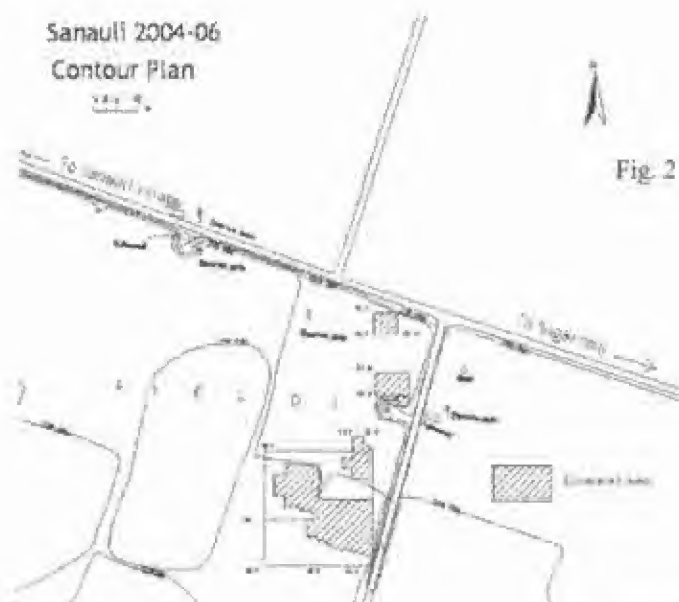


Fig. 2

Sanauli Burial 2004-06
Burial 57

SQ. YD3, QD. 3 & 4



Fig. 3

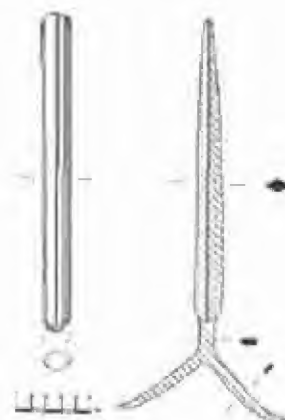
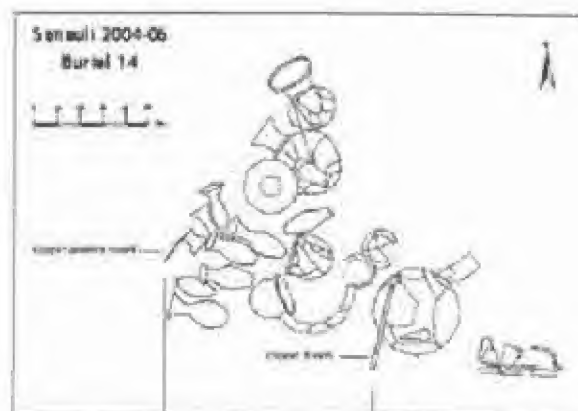
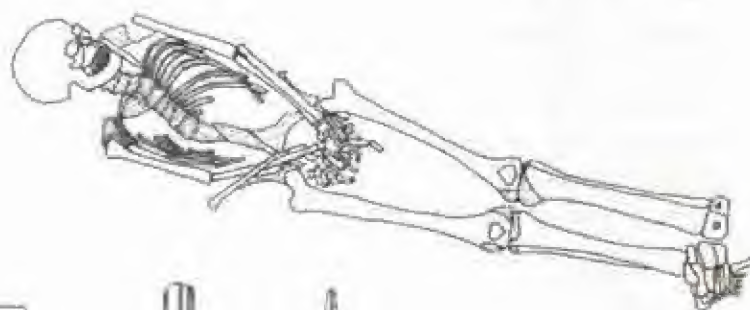


Fig. 4

displayed bones of two male skeletons, aged between 30 to 35 years, arranged in north-south orientation, laid with usual burial pottery. While four medium-sized flask-shaped vessels with flat base, and a rimless small bowl having convex sides and concave base, were placed towards the head, the dish-on-stand (dish having a horizontally splayed out rim, tapering stem, basal part broken and missing) was placed in the middle of the grave, below the hip portion of the skeletons. Placing of a dish-on-stand below the hip or head of the dead seems to have been a general but prominent feature of some ritual, which was in practice as a rule in most of the graves at Sanauli. Among the items of ornaments found in this grave are included a beautifully decorated long, bead of steatite, and another of the milky white banded agate. The steatite bead, the most exquisitely finished example, was found placed close to the neck of one of the two bodies. It was also noted that there was only one skull, that of a male which was partly damaged, whereas all other skeletal remains – long and short bones, including rib bones, bones of pelvic girdle, etc., – are in two sets belonging to two individuals. The placement of bones, however, suggests that the skeletal remains of both the men were buried at the same time. As the burial does not display extended position of the two bodies, it further suggests that bodies were brought from some distant place, but the rituals were performed in respect of both, perhaps jointly. It is possible that they were closely related but unless the sex of the other adult individual is determined, we cannot speculate on their social relationship. As a parallel, one can only quote the example of the 'double burial' of Lothal, a Harappan site of Gujarat.

It is pertinent to observe that in majority of the burials, the dish-on-stand has been found placed either below the hip, or near or below the head; only in a few instances, it has been found placed close to the feet. It clearly suggests that the dish-on-stand was an integral part of the burial furniture at Sanauli, as has also been observed at Lothal (Rao 1979: 143), Kalibangan (Lal 1978: 86-89), Surkotada (1990: 364-371), Dholavira (Bisht 1989: 403; Joshi and Bisht 1994), and various other Harappan sites in India and Pakistan (Singh 1970; Gupta 1972). The dish-on-stand at

Sanauli, which seems to have served as 'offering stand', is found supporting a dead human body, or food grains, or else meat. In one case (for example in Burial 5), a goat-head was found placed on the dish-on-stand.

In respect of the dish-on-stand, a gradual evaluation in terms of its typology has been observed. In the lowest levels, the dish is extra large with horizontally splayed out rim, a short tapering hollow stem, and a circular base with upward-turned rim (Pl.5a). The specimens recovered from the graves belonging to the middle level, have, on the other hand, shallow dish, with slightly out-turned rim, longer tapering stem, and a circular base with upward-turned rim (Pl.5b). The upper level examples are mushroom-shaped. These are the most conspicuous types, hitherto unreported from any of the Protohistoric burial sites. It has a shallow dish with pronounced drooping rim, short curved hollow stem, and base being mirror copy of the dish. The type is peculiar and seems to be a regional variation of the basic Harappan type.

Triple Burial: A Unique Harappan Example

Yet another most interesting discovery at Sanauli is a triple burial (Burial 69) (Pl.6) alongwith two urn burials (Pls.7a, 7b), urns covered with lids, also located in the middle level. This burial has revealed three human skeletons, placed side-by-side in north-south orientation, as in case of the double burial mentioned above. This is not an extended burial since several of the bones were found missing. It was, therefore, a case of secondary burial. The burial furniture comprised 21 pottery vessels – 9 flask-shaped, 2 medium-sized jars (pitchers), each covered with a bull-headed lid, 3 dishes-on stand, and 6 bowls, including two pedestalled bowls – all placed near the heads. The dishes-on-stand were placed in a row parallel to the length of the skeletons, but lower down the hip. One of these, however, was found placed just below the hip, while remaining two were closer to the feet.

There are two important aspects in respect of pottery assemblage from this burial. One, the animal-headed lids

of the two jars mentioned above depict bull figurines, which resemble mature Harappan prototypes; secondly, this burial contained both middle and upper level types of dish-on-stand. As far as the change or evolution of pottery traditions is concerned, in respect of dish-on-stand and pedestalled bowls, this burial reveals the transitional phase, leading to Late Level examples.

This burial, it may be significant to note, had one skull placed upside down. Further, the phalanges were found heaped close to the place where shoulder of the dead would have been placed in normal position of an extended burial. Disposal of three skeletons in a single grave in secondary form at Samauli is a peculiar example of the burial practices in ancient India, so far unreported from any other excavation, except the megaliths of the Iron Age. Again, absence of two human skulls from the grave, which in normal course of things should have been found there, is indicative of some unusual circumstances in which the three closely related persons had died.

As a rule, the pottery has been found placed on the north, near the head. Invariably, the vessels of different shapes and sizes were arranged in odd numbers, namely 3, 5, 7, 9, 11, and so on. The maximum number counted was 21 as noted in the case of this triple burial. The main pottery types placed in this grave include bowls (deep and shallow), flasks of different sizes with button or flat based, and vases of different sizes. As a rule, at least one dish-on-stand has been found placed in one grave, with or without skeleton.

Symbolic Burials

Burial with an Antenna Sword and a Sheath: Yet another unique discovery from Samauli necropolis is an antenna sword and sheath of the Copper Hoard genre from a burial (Burial 14) (Pls. 8a & 8b; Fig. 4). So far, no antenna sword has been found along with a sheath, nor has it come from any of the grave sites.

This burial, found in the lowest level, had no skeletal remains. It contained the antenna sword and 18 pottery vessels – 9 flasks, 4 bowls, 2 dishes-on-stand, and 3 vases

– placed to the northwest of the burial. The sword measures 49.3 cm long. It has a medial rib and a double cutting edge, which is 3.4 cm wide. Its antenna hilt flares out to a width of 21. The sheath, 37 cm long and over 3.4 cm wide, and made of two overlapping parts, was found placed across the grave-length in the middle, where the hip of the dead should have been in position, upon a dish-on-stand kept upside down. Originally, the two parts of the sheath must have been held together with a leather or similar other appropriate perishable material. Some additional fragmentary pots were found placed to the southeast in the grave. The sword, which was placed in an upright position, had its pointed tip towards the sky, and the antenna hilt resting on the burial floor. The sword and the sheath were deliberately placed so to demonstrate valour of the dead, and also pay homage to it even though for one reason or the other its mortal remains were not recovered.

Burial with Stylized Copper Objects: Another interesting symbolic burial (Burial 28) was exposed in the upper level (Pl. 9; Fig. 6). It contained two mushroom-shaped twin dish-on-stand in association with a copper container preserving 28 tiny copper objects in it. The objects are paper-thin, flattened and stylized. Besides, there is a fragmentary animal jaw and a broken brick bearing three finger marks. This feature is equally unique. To the east of it was traced a burnt-brick wall, oriented northwest and southeast. The orientation of this wall is the same as the burials. This is equally unique not reported at any Harappan cemetery.

The dishes-on-stand placed in the graves are of typical shapes confined to the upper level. One of them is taller. Its dish has prominently drooping rim, curve and slender stem, and circular base having upward raised and incurved rim. The other, the smaller one, differs from the taller example in having straight edges of the stem as well as of the base rim.

The most significant grave-good of this burial is the violin-shaped copper container, made out either only of a copper strip, or the strip possibly joined to its thin-sectioned base which is largely corroded now, and mostly gone. The overall shape resembles a human torso. As stated above, it

contained 28 paper-thin, tiny and stylized copper objects arranged thoughtfully in six rows, broadly divisible in two sets of left and right. Each set seemed to have three rows of 6 objects each. There are two complete rows in the left set, which in all contained 6 plus 6 objects. As the other rows are now disturbed, arrangement of these copper objects, however, suggests that there might originally have been 6 objects in 6 rows, thus totaling 36 objects. Of which, 8 are now missing. Besides being tiny, the shape of these objects is also very significant. While their upper part resembles an arrowhead, the lower part looks like a tang with two curved ends in opposite direction.

One more noteworthy feature of this burial is a burnt-brick wall with finished inner face, which, as stated above, is running parallel to the burial in the east (Pl.10). Three other walls, if these were at all there, are not traceable now. Preserved to a length of 3.70 m, with a width of 38 cm and height of 39 cm, it has only five courses extant. The bricks used in the construction of the wall were of aberrant size, measuring 50x38x6 cm or so. The complete length of the wall could not be traced because of the limitations of the area of excavations, still there are indications of its extension in both the directions. Apparently, it was meant to demarcate not a single burial but a group of burials.

As in some other symbolic burials, this burial also has yielded a fragmentary burnt-brick bearing three finger-marks (finger-made groves) on one face of it. The presence of such burnt bricks does not seem to have been lying here accidentally. They seem to have served some specific ritual.

Burial Outlined with Steatite Inlay Pieces: Yet another interesting and novel symbolic burial (Burial 106) was exposed in the lower level. It is again violin-shaped (Pl.11; Fig. 7). The burial displayed a special kind of arrangement of steatite inlays to mark the outline with multiple rows. There were apparently five parallel rows of these inlays – all created by putting inlay pieces together. The outer, middle and inner row was comprised of circular inlays, which alternated with a row made of rectangular inlay

pieces. While the circular inlays were placed in horizontal style, the rectangular inlays were very carefully arranged in vertical and oblique manner to give an impression of twisted gold or copper wire. Additionally, interesting feature associated with this burial was more of these inlays arranged in a circular form on the right side of the violin-shaped figure to look like its head. The overall composition seems to represent a human effigy laid east-west. There were no earthen vessels placed in the grave.

Like Burial 14, this burial was also devoid of any skeletal remains. Instead, it contained a copper sheath placed diagonally across the violin-shaped figure, representing human effigy, possibly the dead to whom this burial belonged. The sheath, which is a part of weaponry, perhaps commemorates its master who might have died in odd circumstances. As his corporeal remains could not be located, his personal weapon, the sheath only, was buried here as a revered grave object.

Close to the above-mentioned human effigy, to its north, was exposed a curvilinear copper object, which was preserved in fragments only. As its complete dimensions could not be recovered, the shape, size, nature and purpose of the object remained undetermined.

Burial with a Human Skull and a Gold Object

A large earthen trough, a lid, a large jar and a dish-on-stand were found placed almost in a row, oriented north-south in Burial 28. By the side of the jar was placed a human skull, the only skeletal remain from this grave. On the top of the forehead, was placed a gold object which was close to the star-shaped and may have represented a stylized human shape (Pl.12; Fig.8). On removal of the earthenware was exposed a fragment of the curved copper object (a strip), which appears to be similar to the copper container of Burial 28 as discussed above. In this case, however, from inside the curved copper strip, were found 6 star-shaped copper objects, which were probably set in a piece of wood.

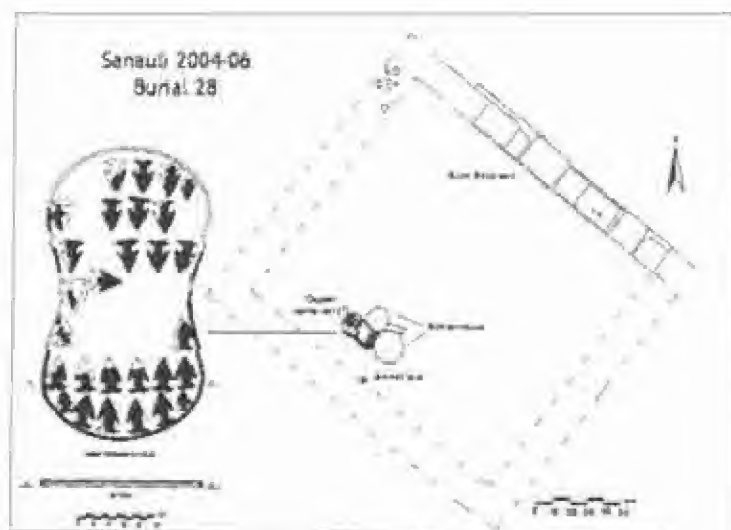


Fig. 5

Fig. 6

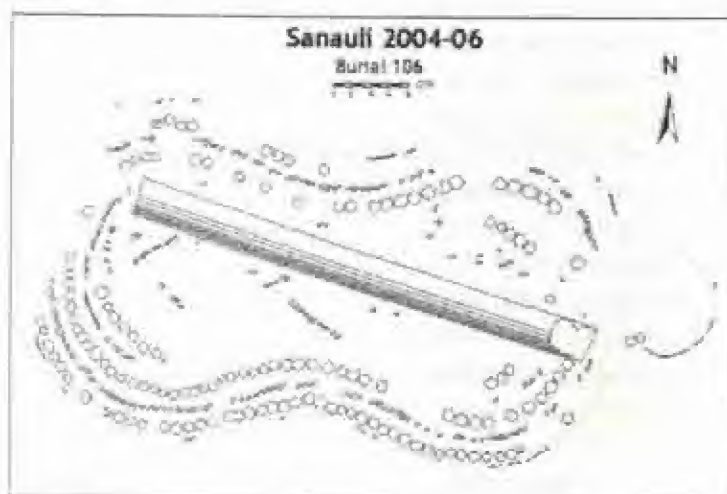
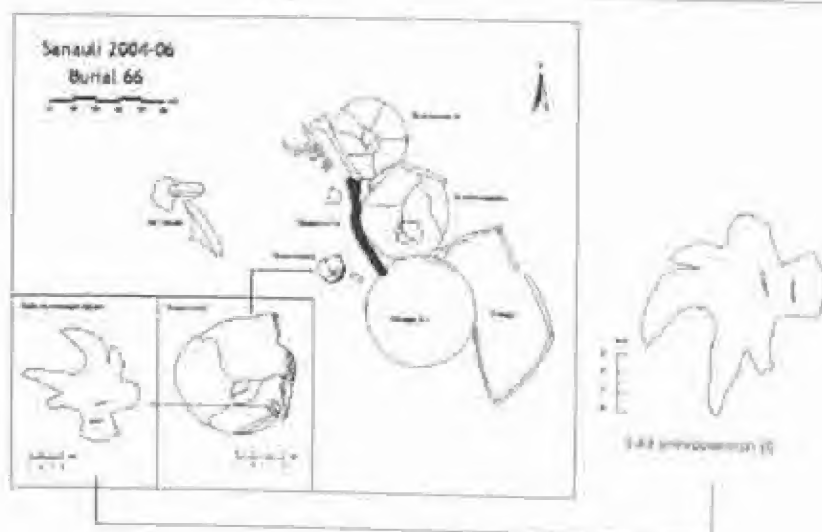


Fig. 7



Child Burials

There were six child burials (Burial 2, 22, 36, 67, 99 and 112), recovered from the middle and upper levels. Of these, the most interesting was Burial 36, that of a child aged two years, wearing an amulet of agate bead tied round his left arm, and a necklace of four agate beads round the neck. The practice of tying amulets round the neck or round the arm continues even today in several traditional Indian societies. In addition, a pottery flask and a small bowl with a flaring out rim, placed below the head, have been recovered from this burial.

Burial with Gold Ornaments

Among the burials containing personnel belongings of gold, copper and semi-precious stones (Pl.13), Burial 95 is most noteworthy. The female, aged about 18 years, wore a close-fitting neck ornament of gold and semi-precious stones and a pair of heart-shaped gold bangles in both the hands. The neck ornament was made by spiraling a thin gold wire round two thick copper wires, held together with small agate beads which were spaced at intervals. Besides these, eight carnelian beads were found close to the neck, which suggests that an additional neck ornament was worn by the dead. The heart-shaped gold bracelets are similar to those found in the year 2000 at Mandi (District Muzaffarnagar, U.P.) where a large hoard of ornaments of gold, silver and semi-precious stones were found in the Harappan context by the villagers almost accidentally.

Below the hip of the dead was found a copper bowl, placed upside down. To the northwest of it were found the usual pottery vessels, 2 flasks and 4 bowls. Considering the fact that the dish-on-stand was generally placed below the hip of the dead, it may be presumed that in this case, the copper bowl had replaced the dish-on-stand. The precious gold ornaments worn by this female is, however, clearly indicative of the elite status of the person.

A gold tiara or *mukuta* was stated to have been recovered by some villagers from the same place while

carrying out levelling operations at the site, along with gold ear-ornaments and a gold belt (*tagri*). The tiara may have been like the one found at Kunal. However, none of these antiquities could so far be recovered. It is not unlikely that all such graves containing gold ornaments in appreciable quantity may have belonged to the elite.

A Trough-like Object of Clay

A solitary example of a completely burnt, hence turned red, sizable oblong trough-like object of clay, was found built-up on the *kankar* bed in middle levels (Pl.14; Fig. 9). It is a specimen of its own kind in the context of a burial site. Oriented east-west, and constricted towards its eastern end, it measures 2.60 m in length, 1.07 m in width, and 0.64 m in depth. Its walls are 6 to 7 cm thick. Well-vitrified droppings and runnels visible at places from inside suggest that it was undergoing a high degree of firing activity. Evidence of applying successive mud plaster coats all along its inner side is worth considering, which indicate its repeated use. The trough, however, has a straight finished opening towards its western end where a good amount of ash, charred human bones and animal jaws, along with over-burnt mud lumps and brickbats, was found. Although broken at several points, the available shape and size gives some idea about its purpose and use. In addition, a complete burnt brick bearing the usual three finger-marks was also found lying inside it. The west wall of the trough also had similar finger-marks.

These pieces of evidence when taken together may indicate that this trough could have been used for cremating the dead. An important point about it, as already noted above, is the east-west orientation of the oblong trough. However, this structural trough is under various kinds of scientific examinations, because of the vitrification of the walls from inside, the red colour of the entire thickness of the walls, around 6 cm at places, the finding of a large number of pieces of the terracotta lid of the trough, the repeated clay plastering of the trough from inside and pieces of vitrified materials still sticking the walls from inside.

Burial with a Small Gold Cap-like Object

Burial 42 revealed a headless male human skeleton in association with nine earthen pots placed towards the northwest, and a gold cap (ear stud ?) placed close to the right side of the skeleton's shoulder (Pl.15). The gold object has the striking resemblance with the modern commanding stick cap. In all probability, this special object indicates the privileged status of the dead.

Burials with Glass Beads

Yet another worth-mentioning find from Sanauli are two burials – Burial 1, which was of a female and primary in nature, and Burial 8, which was symbolic, obviously without any skeletal remains – both containing glass beads hitherto unreported from any Harappan grave of 2nd millennium BC so far (Pl.16). Burial 1, exhumed from the upper levels, yielded 7 glass beads, 6 black and 1 white, lying near the neck. These glass beads might have formed part of a neck ornament of the female. The female also wore a copper bangle (*churi*) in both wrists besides a band (*kalewa*) of tiny decorative steatite beads. Over and above, one terracotta biconical circular bead was found from the waist region, which, in all probability, might had been tied as the waist band (*tagri*). The second burial, Burial 8, which is without skeleton, is excavated from the middle levels. It has yielded 2 glass beads, 1 black and 1 white. These beads, in all probability, belonged to the dead in whose memory these burials were given.

The Copper Hoard Context of the Cemetery

For the first time, the Sanauli excavation has established the association of a Copper Hoard antennae sword with a Harappan Cemetery. So far, two copper antennae swords have been found at Sanauli. Of these, one was found *in situ* inside a grave (Burial No. 14). Interestingly, this sword was placed in upright position on the north of the burial. Its sheath, again of copper, was laid out horizontally across the grave vessels. This is a crucial evidence in favour of the contemporaneity of the Harappans and the Copper Hoard people, which was

doubtful so far. The other example was found lying with a local villager who informed us that he had collected it while digging the site casually and confronting with buried human bones.

Recovery of a copper spear-head from another burial (Burial No. 11) without skeleton is equally significant, although it does not belong to the Copper Hoard.

Anthropological Analysis

A preliminary anthropological study and analysis of nearly 40 skeletons has been carried out by S.R. Walimbe and senior students and colleagues in the Deccan College, Pune. According to their study, out of these, 10 belonged to males and 7 to females. The sex determination of 17 skeletons was not possible. The skeletal remains of five child burials were also analysed, out of which the youngest age-bracket is 1 – 2 years, while two are around 3 – 5 years and two are around 10 years. There are also the remains of six sub-adults.

The average stature estimated for the male ranges from 159 cm to 178 cm and for the female, from 169 cm to 179 cm. On the preliminary analysis it has been observed that the average stature of female is 174 cm while that of male it is only 168 cm. The females are also found to be very robust and tall.

The tibia of one individual (Burial 21) is found to be longer than the femur, which is an exceptional case. The right clavicle on one individual (Burial 37) is very robust and short in comparison with the left one, indicating some kind of occupational stress on the right side.

The dental pathologies include tartar accumulation, enamel hypoplasia (broadly defined to indicate deviations from a normal enamel in its various degrees of absence), and dental discoloration. Some other different dental morphologies are extra cusp-like parastyle, carabelli's cusp (a small additional cusp of upper molars, which is a hereditary feature).

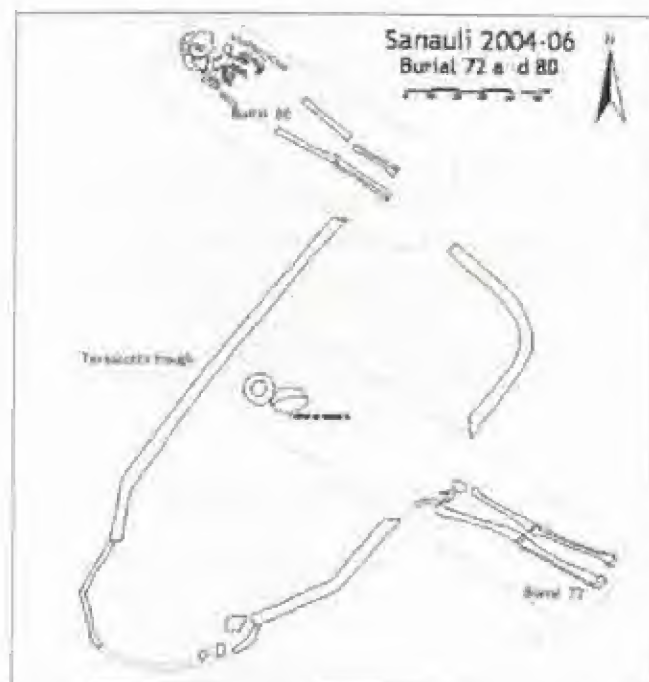
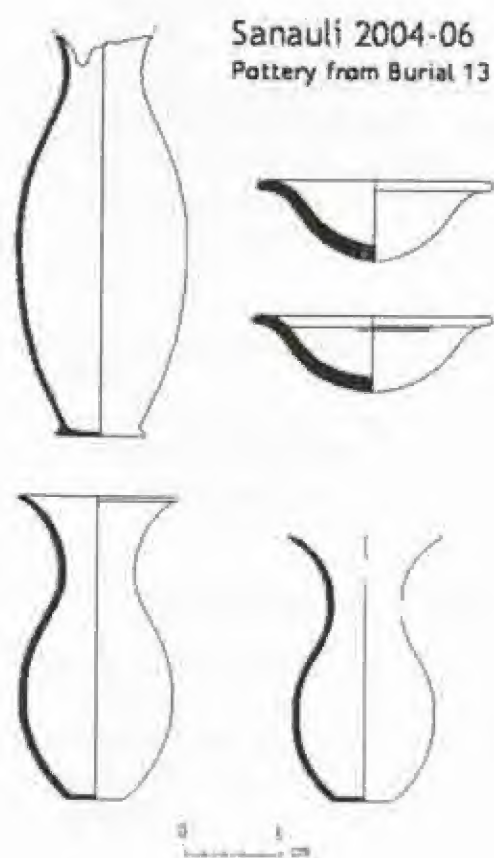
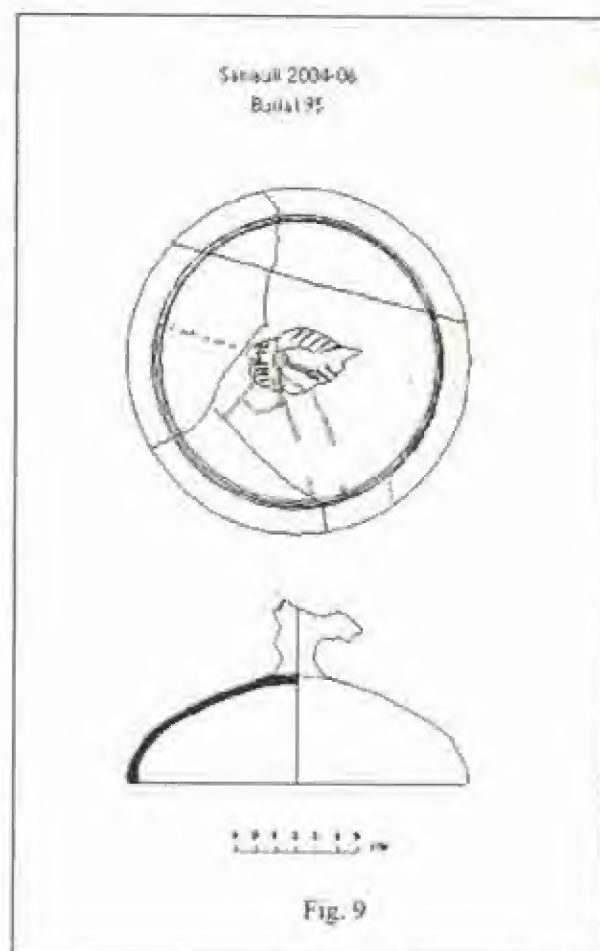


Fig. 8



The skeletal remains from Sanauli, belong to all age-groups, children, adults and aged persons. In one case, there is a skeleton of a hunch-back person also as the palaeopathological studies have confirmed.

Palaeobotanical Remains

Besides faunal remains, charred food grains have also been recovered from some of the graves. Amongst the palaeobotanical samples sent for identification, including those recovered from Burial 93 in the upper levels, R.S. Saraswat has so far been able to identify seeds of *Commelina benghalensis*, which is a rainy season plant growing in damper and moist localities. The leaves and tender shoots of this plant are boiled and consumed as vegetable. Commonly found throughout the Ganga plains, from Uttar Pradesh to West Bengal, Orissa and parts of Madhya Pradesh, the plant is ecologically important to decipher heavy rainfall in the area.

Literary References

Many scholars, while dealing with the modes of disposal of dead in ancient times, have looked into Vedic literature for parallels. Their findings show that both inhumation and cremation were in vogue in those times (Kane 1953: 231-33). There are such terms as *agnidagdha* (Macdonell and Keith 1958: 8) meaning 'burnt with fire', and *amagnidagdha* (*Rigveda* V.8; X.18) meaning dead body 'not burnt with fire'. *Atharvaveda* referred to *paroptah*, meaning 'casting out', and *uddhuah*, meaning 'exposure to the elements' as two other methods of disposing the dead.

Certain hymns in *Rigveda* describe rituals pertaining to burial (RV.10.14). In one instance, a male dead is referred to have been laid in the grave with full attire, holding a bow in one hand. There is a reference to *vriksha* for coffin in the *Atharvaveda*. A wooden coffin has already been excavated at Harappa which is a well-known example, now an oft-quoted reference. Some references in the *Rigveda* and *Atharvaveda* (AV 5.30.14) mention *bhumigriha*, meaning 'house in the earth'. This may suggest a mud brick

house made for the dead. Mud bricks used for lining a burial at Kalibangan cemetery, and Burial 116 at Sanauli may suggest such *bhumigriha*, the burial (Pl.17).

The burial referred to in the *Vajasaneyi Samhita* is said to allude to post-cremation burial of ashes in the burial ground (*Smasana*). At Kalibangan, one could notice a human skeleton burnt at specific points only, namely the mouth, shoulders, chest, etc. Another evidence of cremation is of charred human bones besides post-cremation burials in pots. A. Ghosh has brought to light a cremation ground at Tarkhanwala Dehra, Rajasthan.

Association of Birds and Animals with the Dead

Regarding other ceremonies observed in disposing the dead, the *Rigveda* refers to wrapping of the body in flax. According to the *Atharvaveda* a draft-ox was burnt for the dead presumably to ride in the next world. The Sanauli people seemed to have offered goat and ox to the dead, as is evident from the horns of a goat found in burial 5, and the teeth of bull or *Bos indicus* in burial 52&53. In addition to actual animal sacrificial remains, symbolic representation of animals and birds was also noticed, on pottery-lids, for example. The triple extended burial has yielded two bull-headed lids of pots, stylistically resembling mature Harappan types. From another grave was recovered a solitary bird-headed lid, decorated with linear motifs executed in white painting. White painted motifs from the upper (late) levels of a Harappan site are not so common features, and are reminiscent of the early Harappan genre and its survival through Harappan levels. The two examples, bull and bird headed lids, are indicative of animal and bird symbolism in burial practices at Sanauli (Pl.18a,b&c; Fig. 10).

Some Other Significant Features

Two burials also revealed evidence of surplus pots which were not used in the graves, but disposed of in or near these. In one of the burials, there were two such pots, and in another, ten pots. These pots were observed haphazardly stacked as these were casually placed by the

side of the graves. The feature suggests that not all the pots brought for the dead were always used; only required numbers of them were used in the rituals, and the remainders were left unused.

Based on the field survey, and probings made at three places, the area of the cemetery at Sanauli appears to have been spread over nine acres of land, or may be even more. This is thus one of the largest Protohistoric necropolises in the Indian subcontinent known so far to us.

Different modes of disposing the dead at Sanauli can also be interpreted in terms of different belief-systems prevailing amongst the peoples who were culturally one, and in close contact with the other contemporary social and cultural groups, such as the Copper Hoard people, and possibly others.

Based on archaeological evidence unearthed at Sanauli, it seems that the material culture of Sanauli was the eastern regional manifestation of the Harappan Civilization in the upper Ganga-Yamuna doab. Till further corroborative evidence comes to light from excavations of its habitational site, we are labelling it "Sanauli Complex" (Harappan-OCP Combine Complex). We are tentatively placing it in the time-bracket of *circa* 2100 BC–1800 BC, with a possibility to shift the date-bracket by one or two centuries at either end.

Traditions die hard. Sanauli presents a good example of it in the context. The villagers at Sanauli are still constructing *pitrasthanas*, a small symbolic house for the dead (*pitras* – fathers and mothers, grand fathers and grandmothers, and so on), amidst their agricultural fields, outside the village, for regular worship and offerings throughout the year. These *pitrasthanas* are a common sight on the agricultural fields close to the excavated site. The *pitras* are considered to have attained the status of a *deva* (*pitradevata*). On all auspicious occasions, such as marriage, birth of a child, construction of a house, etc., these *pitradevatas* are invoked and prayed for accomplishment and fulfilment of mundane wishes. The belief the villagers enjoy is that the prayers are answered.

The habitational area of the Protohistoric Sanauli is most probably located beneath the modern village of the same name, which at present is situated at a distance of about 500 m west to the excavated site. This has not been confirmed yet. Only future fieldwork will throw further light on the authors of the Sanauli necropolis.

The Contributions of Sanauli to Indian Archaeology

Never before a site like Sanauli was found and excavated in India. An absolutely plain ground with thick deposits of sand and silt harbouring lush green cultivated field of the best variety of sugarcane could never attract any archaeologist to explore it, but then it has yielded the remains of as many as 116 graves in a huge cemetery which, if further excavated, will certainly yield many more of them. Moreover, the burials have been found laid in as many three superimposed levels of the 2.40 m deposit of geological formations of a river basin, clearly indicating the fact that the necropolis was in use for several centuries. We have tentatively dated it to 2200 BC–1800 BC time-bracket. It is generally labelled "Late Harappan" but here certainly overlapping with the Mature Harappan as some of the pot-forms, like dish-on-stand with slender stem and large open dish, as well as painted motifs on pottery, such as the deer and hatched triangles show. The situation is somewhat like "Cemetery H" of Harappa excavated in recent years by Meadow and Kenoyer. In "Cemetery H" burnt-brick structures have been found along with many beads of semiprecious stones, some certainly of Mature Harappan origin. At Sanauli also there are the remains of burnt-brick structures and a variety of beads of semiprecious stones, steatite and faience some of which are of Mature Harappan types, for example the biconical or barrel shaped long beads of carnelian and beads of agate of variegated natural colours found at Rehman Dheri, Harappa, Mandi, etc. The pottery forms have at least two types which are significant: one is the long necked red ware flask with flaring mouth and globular or bulbous body with ring base. It is there in "Cemetery H" and it is also there at Hulas and several sites in Punjab, Haryana and western Uttar Pradesh. The short stemmed dish-on-stand

with dish having broad drooping sides is also there in 'Cemetery H' through the western Uttar Pradesh sites.

But there is something more than this. First, the evolution or changes in the form related to dish-on-stand. We feel that the burials of the earliest of the three levels many represent the stage of 'Cemetery R-37' of Harappa in which extended burials are found associated with the Mature Harappan types whereas the burials of the uppermost level with stumpy dish-on-stand with drooping sides may represent the Late Harappan or 'Cemetery H' stage. Like 'Cemetery H' there are two large urn burials with lids at Sanauli.

Secondly, for the first time an eastern Harappan site has yielded a antennae sword with long antennae, like many of them found in the Copper Hoards of the Ganga-Yamuna *doab* and beyond, in the mid-Ganga basin. Earlier to this discovery a fragmentary copper anthropomorphic artefact of the Copper Hoard type was found at Lothal in association with the late stage of the Mature Harappan. Some TL dates (c. 2600-1100 BC) are also there for the OC Ware-Copper Hoard associated materials. There is, therefore, every possibility that the copper Hoards also belong to the time bracket of 2200 BC-1800 BC. The uniqueness of the Sanauli find is also the presence of a copper sheath in which the antennae sword may have been kept by its owner as and when he liked; such a sheath has never been found in any of the Copper Hoards reported so far.

Thirdly, the heart-shaped gold bracelets found in a grave at Sanauli has its counterparts at Mandi as well as Harappa and Mohenjo-daro, made even in other materials, such as faience, in the context of Mature Phase of the Harappan Civilization.

Fourthly, a built *in situ* clay trough with a lid (?) with rounded ends, oriented EW, is also unique since no where else in the Harappan context anything like this has been so far reported. In fact was perhaps like a sarcophagus.

Fifthly, decorations made of copper and steatite pieces in different shapes and forms, possibly fixed on cloth or

metal, and placed in graves are equally unique.

Thus, while Sanauli shares many features with other Mature and Late Harappan complexes it has also yielded several unique features not reported so far from other sites.

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Materials and Techniques of Wall Paintings of Rajasthan

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In the past we had been observing that many wall paintings of India, particularly of Rajasthan, have a somewhat different appearance than that of the wall paintings of other places in India. Many of them had a shine, which was absent in wall paintings found elsewhere. We had conducted a detailed survey of literature and also observed the techniques used by various traditional artists. On that basis, we have come to the conclusion that the technique of Rajasthan wall paintings was differing in several respects from other wall paintings. We named this technique as "Rajasthani Technique", and on that basis presented a paper with our preliminary observations at the ICOM-Committee of Conservation held at Amsterdam in 1981. It was neither pure fresco, nor pure secco. It seemed to be a combination of both.

Later on, in order to test our hypothesis, we examined many wall paintings in Rajasthan and analyzed some of them to find out their techniques of execution and the materials used. Given below are our findings.

Technique of Painting

For making wall paintings normally two techniques

have been described to have been used, namely Fresco and Secco (Tempera). In the Fresco technique of painting, paint without any adhesive is laid on wet lime plaster. The lime plaster on drying, embeds the pigments particles on its surface and retains them there. In the Secco technique, plaster, of lime or of other materials, like clay, is allowed to dry and the paint, which is mixed with a binding medium, is applied on the dry surface.

The Rajasthan technique is entirely different. First in the lime plaster, some organic matter like *Urad Dal*, pulp of *Bel* fruit, jaggery, curd, etc., are mixed. Only then this plaster is applied on the wall, and while it is still wet, it is thoroughly polished with a piece of agate stone with a smooth surface called burnisher or polisher. This act of burnishing or rubbing, imparts a high gloss to the plaster surface. Paint, in which a binding medium is mixed, is then applied and again polished with an agate burnisher.

Prior to our paper published in 1981, no one who wanted to study the techniques and materials of wall paintings had taken this indigenous technique into account. In order to satisfy ourselves that the Rajasthani technique, locally known as *Ala-gila*, was indeed prevalent in

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Rajasthan, we undertook a detailed study of wall paintings in the state.

We selected seven sites with mural painting in various regions of Rajasthan for our study. These are as follows:

1) Sheesh Mahal, Nagaur Fort, Nagaur; 2) Rani Handi Mahal, Nagaur Fort, Nagaur; 3) Moghul Gateway, Bairat; 4) Sanwaria House, Jaipur; 5) Ganesh Pol, Amber fort, Amber, Jaipur; 6) Gosaion – Ki-Chhatra, Jaipur; 7) Sita-Ram temple, Dugari Fort, Bundi.

Analytical Studies

Sheesh Mahal, Nagaur Fort, Nagaur

Nagaur is situated between Jodhpur and Bikaner, on the Jodhpur-Bikaner railway route. There are several palaces inside the Fort, the most important of which is Sheesh Mahal or Akbari Mahal. Wall paintings exist in most of these palaces and are exquisite examples of art of that period. In the Sheesh Mahal, there are excellent representations of these paintings belonging to the 18th century. Samples of plaster and pigments were collected from various locations in the Sheesh Mahal.

The carrier of murals is wall, made of red sandstone blocks, shaped like bricks. Some of the blocks were as big as 80 x 28 cm. They were fixed together in an alternate order, with one big block and one small block. Lime mortar was used to join them.

Plaster: Plaster, which was of an average thickness of 2 cm, was made of three distinct layers. The first layer was somewhat grey and was composed of lime and sand as inert materials. Some vegetable fibers were found mixed in it.

The middle layer was about 0.5 cm thick and white. Under polarizing microscope, lime particles and marble dust were identified. The final layer was very thin made of lime only and about 2-3 mm thick. Chemical analysis of the plaster indicated the presence of organic material also,

which shows that curd and molasses or pulp of some fruits might have been added to this plaster as was usual in the Rajasthani technique.

Pigments: Use of as many as seven colours, namely, red, blue, green, white, yellow, black and golden has been noticed in Sheesh Mahal. Three types of red were used. They were identified as red lead, red ochre and haematite. Blue was indigo, an organic colouring material. It was present in very small amount. Perhaps most of the indigo has faded, as it is not a very stable pigment in the case of wall paintings. Green was identified as malachite and yellow as orpiment. Normally chalk, derived either from conch shell or from limestone, is the most popular white pigment but at Sheesh Mahal, one found chalk as well as zinc white as white pigments. The reason may be the use of indigo. As indigo cannot stay over lime ground due to its alkaline action; it is generally applied over a zinc white coating. Black is lamp black. Gold has been used to paint jewellery.

At some places, mainly on the faces of human figures, a very peculiar type of problem, i.e., alteration to black colour was found (Pl. I). Samples having this problem were collected from different places and analyzed using XRD method. The black compound was found to be PbO , with some Pb_3O_4 . Hence, it is concluded that red lead, which was mixed with white to achieve a skin tone changed in course of time to black PbO . XRD study of a sample taken from an unaltered portion shows that this substance was red lead, i.e., Pb_3O_4 .

Salts from salt efflorescence parts were analyzed by micro-chemical analysis and were found to be nitrates and sulphates.

It is, therefore, certain that the typical Rajasthani technique (*Ala-gila*) was used in making mural paintings of the Sheesh Mahal, Nagaur. There was a very high gloss on the painting surface and burnishing marks were also found present. Organic material was detected in the plaster, which is always mixed for preparation of the plaster in the

Rajasthani technique, as noted earlier. The adherence of the paint with the plaster was also excellent which, too, is an indication of the Rajasthani technique of mixing jaggery, etc. in the plaster.

Rani Handi Mahal, Nagaur Fort, Nagaur

Rani Handi Mahal, also called as Zanana Mahal is situated in the same fort, i.e. Nagaur Fort, and the paintings of this palace belong to the same period, that of Maharaja Bakhat Singh (1724-1750).

Plaster and pigments were analyzed and the results of which are given below:

Plaster: The plaster is three-layered. Here the addition of sand is more due to which the plaster is very weak and its cohesion power is also very low.

The first layer is thick about 1.3 cm and made of lime (50%) and sand (50%). Vegetable fibres are present in this layer. The second layer is about 0.5 cm thick and is made of lime, sand and a small amount of brick powder. No fibrous material was detected. The third layer is pure lime coat and thoroughly burnished. Analysis indicated the presence of some organic material in the plaster.

Pigments: Six colours in different tones and combinations have been found to be used here, namely red, green, brown, black, white and yellow.

Four or five different combinations of red pigments have been used. At most of the places red lead is used mixed with cinnabar (on garments). Red ochre and red lead have also been used separately in pure forms. In a very few places, e.g., jewellery, fibres has been mixed with haematite.

Green is malachite and yellow is yellow ochre, not orpiment. No gold could be traced in these murals. White is zinc white as in Sheesh Mahal. Black was lamp black. The brown colour has extensively been used and it was red ochre with some black particles, most probably of lamp

black. Some samples were pure red lead (Pb_3O_4), while some were a mixture of red lead and cinnabar. In both types of samples only red lead has been found changed to PbO_2 or PbS .

Technique of Painting

The technique of execution in the Rani Handi Mahal is also a typical example of Rajasthani technique. The paintings are highly burnished as evident from the burnishing marks. Organic material was also found in the plaster material. In the Rani Handi Mahal also, there is the alteration of body colour. In this case red lead has been converted to black product. XRD analysis showed that this black product was a mixture of PbS and PbO_2 . Both of them are black in colour.

Moghul Gateway, Bairat

Situated at Bairat, a small village in district Jaipur, on the Jaipur-Delhi route, is an unusual building, known as Moghul Gateway. According to literature, the building was constructed in 16th century. The walls of the building are embellished with beautiful paintings on the interior as well as on the exterior. Moghul style of paintings occurs on the ceiling of the central dome as well as on the walls. An inscription is also painted on the walls of the central hall.

Plaster: Here the plaster was of two types: painted and unpainted. In the cross-section of painted plaster, we found three distinct layers, which may be classified as: rough, medium and fine. The rough layer was composed of lime, sand, brick powder and vegetable fibres of jute. The second layer was composed of lime and sand only. The third or final layer is the finest layer and composed of lime and marble dust only. Curiously, clear burnishing marks were noticed on different layers of the plaster. The unpainted plaster, on the other hand, was composed of only two layers – rough and fine. The rough plaster was made of lime, brick powder and sand but the fine layer was composed of only lime and very small amount of sand.

Pigments: Only five colours were used here – red, green,

yellow, white and black. Pigments were identified as earth colours, i.e., red ochre, terre-verte and yellow ochre. The black was lamp black and white was chalk.

Technique of Painting

The technique of painting was fresco in some places and Rajasthani *ala-gila* in some others. By the cross-section also, it is clear that the pigments are embedded within a very thin layer of CaCO_3 crystals, i.e., the paint layer is not a superficial layer. On the other hand, in some areas there are burnishing marks, indicative of Rajasthani technique.

The floral designs have been done at this site with a special technique of engraving known as *Ukerni* (*sgraffito*) technique. For this, the artist first applied a layer of white plaster, which was completely painted over with red ochre mixed with simple water or limewater. When dried, floral motifs were drawn over it and then chiseled with a sharp tool. The underlying white layer shows through the chiseled out design.

Sanwaria House, Jaipur

Sanwaria House is very small and only about 500 years old, consisting of a small room with a verandah in front of it. Both the sections were fully decorated with murals. The paintings were very bright and done in miniature style (Pl.2).

Plaster: The plaster was very fragile and weak, and at several places lacunae in the plaster with the paintings were seen. It was made by applying only two layers, one very rough and the other very fine. The rough layer was red and composed of lime, sand, concrete and brick powder. No vegetable fibres are found present. The fine layer is very thin and composed of only lime. It is much stronger than the underlying plaster layer. No organic material was found.

Pigments: At several places a mixture of red lead and cinnabar has been used as was confirmed by emission spectrograph as well as XRD. But at some other places,

use of pure cinnabar was found as was confirmed by XRD.

Gold has been extensively used for yellow tone as well as for jewellery. For green, only malachite has been used; lamp black and chalk were analyzed as black and white pigments, respectively. Although blue was not a common pigment used at this point of time, in Rajasthan it was used in late 18th century, but here its use was detected at an earlier date.

Technique of Painting

The technique of these paintings is secco or tempera. An organic medium has been found to be used in preparing the paint. When we soaked a sample of painted plaster in water, the organic matter disintegrated.

These paintings are a case of over-painting, because entirely different colours were found underlying the superficial colours. e.g., under the red paint (cinnabar + red lead) we found green pigment, which was analyzed as terre-verte, and under the golden surface, red pigment was present which was red lead. Perhaps these two layers of paintings belong to two different periods and were done by different persons. A characteristic flaking of the paint is also an indication of the tempera technique.

Ganesh Pol, Amber Fort, Amber

The Amber Fort is situated on a hillock about 12 km to the north-east of Jaipur city, on the main road to Delhi. Amber was the old capital of Kachhawaha Rajputs who ruled in this area in the 16th-17th century. According to the historical accounts, Raja Man Singh founded Amber in 1590. Amongst the painted structures inside the Amber Fort, the most fascinating is the Ganesh Pol, which is a double-storied main gate of the fort. All around the door and on the two side arched niches, there are paintings of floral designs and geometrical patterns. The main attraction is a painted image of Ganesha seated on a *chowki* or low pedestal, in the middle, just above the door. The results of the analysis of plaster and pigments are as follows:

Plaster: The plaster used at the Ganesh Pol was found to be of two types:

1. that used for the unpainted wall, and
2. that used for the painted wall.

The first type of plaster was composed of two layers. The lower layer was about 2 mm thick and pinkish in colour. It was composed of lime, sand and *surkhi* (brick powder). No fibrous material was present. The upper layer of the plaster was composed of slaked lime without *surkhi*.

The second type of plaster used for the painted surface also consisted of two thin layers. The lower layer was about 2 mm thick and composed of lime and sand. The second layer, just below the painted surface, was composed of pure slaked lime.

The murals were burnished, as indicated by the burnishing marks on the plaster. This is a typical Rajasthani technique of painting (*ala-gila*).

Pigments: Five colours have been found to be used at the Ganesh Pol—red, green yellow, black and white, three of these pigments were identified as earth colours—red ochre, yellow ochre and terre-verte. Black was lamp black and the white was chalk.

Technique of Painting: The plaster as well as the painted surface was found as thoroughly burnished. Water, cold as well as hot, had practically no effect on the paint. Organic matter was present in the plaster. There is a very high gloss on the surface. It can thus be concluded that the paintings of the Ganesh Pol are examples of the typical Rajasthani technique of painting (*ala-gila*).

Gosaion-Ki-Chhatri, Jaipur

About 3 km from Jaipur, on the main road from Jaipur to Amber, is a group of small structures, known as Gosaion-ki-chhatri. A *Chhatri* is a monument erected in the memory of a ruler, or an important nobleman, where his cremation is held. The Gosaion-ki-chhatri is a very interesting

complex of small *chhatris*, having paintings on their walls, pillars and ceilings. On stylistic grounds they seem to be of the late 18th century.

The results of the analysis of materials used at Gosaion-ki-Chhatri are as follows:

Plaster: There are four layers present in the plaster. The first layer was composed of lime, sand and brick powder (*surkhi*). The colour of this layer was dirty brown. The second coat of the plaster (6-8 mm thick), was light brown and was composed of lime and sand. The surface of this layer was burnished. The third layer of the plaster was white and thin, i.e., 1-2 mm. It was composed of almost pure lime. This layer was also burnished. The final coating of lime was very thin and fine, almost like lime wash. The final surface was also thoroughly burnished. The plaster contained carbohydrates and proteinous material.

Pigments: In the paintings of these *chhatris*, six or seven colours have been used. These colours are yellowish-brown, reddish-brown, blue, green, white and black. It was observed that nowhere the artist has used bright red colour, whereas bright red colour was very commonly used in most of the paintings in Rajasthan. One possibility could be that, although red pigment was used, yet on account of some changes in its composition, it has darkened to brown. On close examination, the chromatic alteration of the red pigment was found. Faces and hands of many human figures, which originally must have been of red or pink colour, have been completely changed to black.

The pigment of yellowish-brown colour, on analysis, was found to be raw sienna. This pigment is slightly different from yellow ochre. Raw sienna is also hydrated ferric oxide, mixed with alumina and silica, but it has a slightly deeper tint than yellow ochre. It is warmer and is considerably more transparent. It gave positive tests for manganese. Raw sienna has some amount of MnO_2 , too. The green pigment was identified as green earth or terre-verte. The white pigment was identified as chalk. The black pigment was lamp black. The blue pigment was identified as azurite, i.e., basic copper carbonate. The blue colour

has not been widely used but wherever used it has faded at several places. At many places red and pink colours have changed to black (Pl.3). After chemical analysis, this alteration was categorized in two types – one superficial and the other in the total thickness of the paint. A sample of this particular type was taken and analyzed by optical microscopy as well as by XRD. From the results, we conclude that red lead (Pb_3O_4) got changed to PbO , (black). A small quantity of iron was also detected but possibly it was an impurity. Another sample gave positive for red ochre. It is likely that this part changed to black on account of the deposition of dust, dirt, soot, etc. In this case also, the darkening was only superficial.

At another place, the sample gave positive test for lead, indicating that the pigment was red lead (*sindur*). Mercury and iron were completely absent. With x-ray diffraction examination, this resultant black product was found to be PbO , and not PbS . This type of alteration in the colour value of red pigments has been noticed at several other sites also, e.g., Moghul Gateway, Bairat, Sheesh Mahal, Nagaur, etc. The darkening of cinnabar has also been reported at some other places. Cinnabar is found in four main forms:

1. HgS , vermilion or cinnabar
2. HgS , a black cubic form of meta cinnabarite
3. HgS , a red hexagonal form, not found in nature
4. An amorphous black form.

The final black product was found to be in amorphous black form. Red cinnabar may change into amorphous black form, due to high temperature and direct sunlight, and on this site, both these factors were present. However, this change is only in the physical form and properties, and there is no chemical reaction. It is for this reason that only the surface is darkened.

Technique of Painting

The paintings here have been done in the typical Rajasthani technique of painting (*ala-gila*), in which the plaster is prepared with slaked lime mixed with sand and

marble dust and several organic additives. The finer details of ornamentation or of costumes, etc. were quite often done later and in tempera technique. This type of combination of techniques is necessitated, because fine details cannot be filled in the fresco technique and for fresco, work must be finished within a limited time.

It is due to this basic difference between the Rajasthani technique and the fresco, it is imperative that the Rajasthani paintings are not washed with water, as is possible in case of fresco. Water is certain to remove the fine details, which are done in tempera, and the paintings will appear to be washed.

Sita-Ram Temple, Dugari Fort, Bundi

Dugari is a small town, situated about 8 km north-east of Bundi. The Dugari Fort is situated on a hill-top near 'Kanak Sagar'. Inside this fort is a temple, called 'Sita Ram Temple', said to be constructed in the late 18th century.

The walls as well as the ceilings of the temple are decorated with beautiful murals. The paintings are done in Mewar and Bundi styles. The subject of these paintings is mainly related to Ramayana stories and other religious themes. The ceiling is painted with floral and geometrical motifs and designs.

The temple is now in a very bad condition due to lack of maintenance and care. A range of pigments has been used here. The results of chemical analysis are as follows:

Plaster: The plaster has four layers. The first layer was made of clay, silica (sand), lime and stone grit. A great amount of vegetable fibres has been added in matrix of this layer. Due to mixing of clay, the adhesive strength was very low. The second layer (about 1-2 cm thick) was composed of lime and sand only. The colour was white. No fibrous material was added to it. The third layer was almost the same in composition as the second one. The only difference was in the amount of silica (sand), which was much less in the third layer. No brick powder or fibre was added to it. The final layer was very thin lime wash.

Over this layer, the painting was done. The plaster samples gave positive test for protein.

Pigments: Though the use of red pigment in the temple was profuse, yet at most of the places, it has turned black. Three red-coloured materials were identified here. Out of them, the most commonly used red pigment was red lead, i.e., Pb_3O_4 , that was mostly converted to black substance. At some places, red lead has been mixed with a little of cinnabar, giving a different colour. The third red was an organic dye, of pinkish colour. It was identified as madder lake. Green pigment was identified as terre-verte. Yellow pigment was found to be orpiment (As_2S_3). Ultramarine (perhaps lapis lazuli, in Hindi called *lajwari*) was identified here. Lamp black has been used for black colour. The only white was found to be chalk. Pure gold was identified. Under the golden paint, there was red paint produced from lead. Use of red colour under gold enhances the shine of gold.

It was noticed that two colours have been altered to black. One is red and other is white. On examination of the cross-section, it was confirmed that it was not a surface change only, but the entire material has changed its chemical composition. The changed red pigment was found to be red lead and the altered black material was found to be a mixture of PbO , and PbS . This confirmation was done by X-ray diffraction method. The other changed pigment was white. It was also a chemical change. The white pigment used here was chalk but at the altered white areas, it was found that chalk has been mixed with a little red lead to get a pinkish tinge (perhaps for skin and face).

The Technique of Painting

It appears that the artist, at the first instance, drew outline of the figures and designs in black colour. The sketches of some of the paintings were visible at several exposed areas. Due to some reasons, paintings were left incomplete, and at those places only black outlines were seen. Glossy shine due to burnishing is completely absent. By the study of cross-section, it is clear that the paint was lying only on the surface of the plaster and has not

penetrated in the plaster layer. Hence, the technique is *secco*.

In some areas, particularly the borders of certain panels, the floral and geometrical designs are executed in the technique called *agrafitto* or '*Ukerni*' as noted earlier. Sometimes, when it is required to have a pattern of more than one colour, several layers of coloured plaster were applied one over the other.

Conclusion

From the above, it is clear that predominantly Rajasthani technique (*Ala-gila*) was used for paintings in Rajasthan. Other techniques, like Fresco and Secco, were also used independently. For fine details like jewellery, secco technique was preferred over Rajasthani technique. Earlier whenever analysis of painting technique was conducted, only fresco or secco (*tempera*) techniques were taken into consideration. However, now we have established that the Rajasthani technique (*ala-gila*) was an indigenous and popular painting technique in India. Our other studies indicate that this technique was used in all parts of India and was not confined to Rajasthan. Studies on the materials and technique of wall paintings of Sri Lanka conducted by O.P. Agrawal and Nanda Wickramasinghe demonstrated that this technique of painting was used at several places of Sri Lanka also.

As a corollary of the above studies, we would like to suggest that fresh analysis of Indian wall paintings, which were analyzed by scientists in the past, should be done, so that the probability of their being done in Rajasthani technique (*ala-gila*) is examined. Earlier, this point was totally overlooked.

Another area in which intense research is required concerns reconversion of altered red lead pigments back to red. We found that in many cases red colour has changed. According to our thinking this has happened due to intense heat. So far there is no successful method available to reform the black colour back to its original colour.

Course of Vedic River Saraswati as Deciphered from Latest Satellite Data

J R SHARMA, A K GUPTA AND B K BHADRA*

Our recent work shows that the River Saraswati originated in the Himalayas and dried up around 2000-1500 BC, due to tectonic and palaeo-climatic changes. Thar desert region today does not show the presence of any perennial river system or even of a major seasonal stream, except river Luni, which marks the eastern limit of the Thar desert and flows parallel to the Aravali mountains.

On the banks of the now 'lost' Saraswati, once upon a time there thrived the Harappan Civilization. Our study-area forms that part of the Thar Desert terrain that includes parts of Rajasthan, Gujarat (Kachchh region), Haryana and Punjab states in NW India and part of Sindh and Bahawalpur Provinces in Pakistan (eastern part of the Indus River Basin).

1.1 Courses demarcated in Rajasthan and adjoining Pakistan region

A dense network of palaeo-channels is observed in the area parallel to the Aravali hills and in the area adjoining Pakistan region (Pl. I). While the palaeo-channels passing through river Ghaggar are prominent and broad, the palaeo-channels passing closer to the Aravalis are narrow (only a

few hundred m wide). Palaeo-channels draining in different directions, many of them west-flowing have also been mapped; however, most of these are as discontinuous channels. Five drainage courses of different river systems joining Rann of Kachchh have been worked out in Rajasthan based on the mapped palaeo-channels (Fig. 1). These courses fall in two major categories and pass through as follows

Courses closer to Northwestern Indian Border (Courses are listed in order of their location from west to east)

1. Main Saraswati course 4-10 km wide passing through river Ghaggar via Banawali-Anupgarh-NW of Beriyanwala-Ganeriwala-West of Nawakot-and Islamgarh-Tanot-Longewalatar-West of Ghotaru-East of Pairewarotar-running parallel to Nara river-NE of Khipro-Munabao-East of Islamkot and meeting the Rann of Kachchh.
2. The course passes through river Ghaggar via Banawali-Anupgarh-NW of Beriyanwala, Rukanpur-Nawakot-West of Islamgarh-Tanot-Longewala Tar-Ghotaru-Dhanana-West of Myajlar-Munabao-East of

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Islamkot and meeting the Rann of Kachchh. This is the second major course passing along the border with 4-6 km wide channel.

3. The course originates from the main channel (Channel - 5, in Figure-4) near Bijnot and passes through Kanod-Gadra Road, East of Islamkot, and meets the main channel east of Munaban and finally discharging into the Rann of Kachchh. The channel (only a few hundred meters wide) joins Kanod, Meetha and Khara rann as well.

Courses closer to the Aravali hills

4. Passing through Hisar-Sewani-Rajgarh-East of Churu-Fatehpur-Didwana-East of Taranau-Merta-Pipar-North of Luni-Kalyanpur-Pachpadra and meeting Rann of Kachchh through a channel via Sirva or

directly through the present course of Luni

5. Passing through Loharu-Navalgarh-Sikar- Maulasar-Degana-Merta-Pipar-North of Luni-Kalyanpur-Pachpadra and meeting the Rann of Kachchh through a channel via Sirva or directly through the present course of Luni

Saraswati main course

The river Saraswati originated in the Himalayas and it has been a very mighty and perennial river in the Early Vedic period. In the Rigvedic literature it is described as "Ambitame Naditame Devitame" that is the best of mothers, best of rivers and the best of goddess. The discovery of a large number of sites of Pre, Early and Mature Harappan civilization along the banks of the Saraswati also indicates that during the 4th-3rd millenia BC, it was like the Indus, full of water.

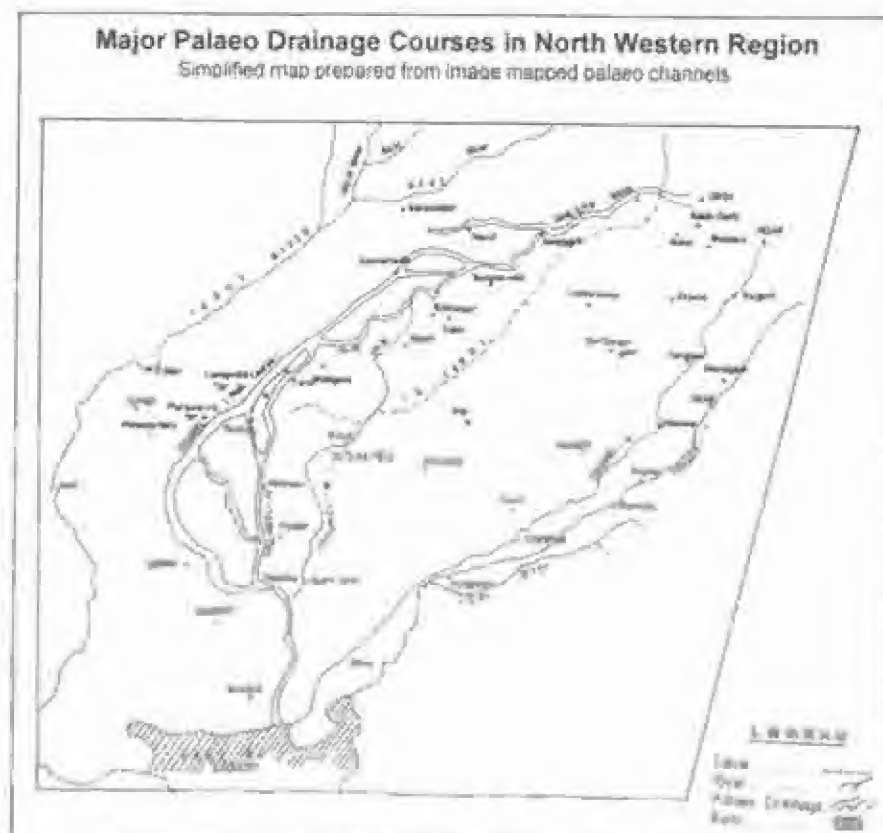


Fig 1

Courses delineated along the Aravali Hills are much thinner, (only a few hundred meters wide) as compared to the width of the channels along the Indo-Pak border with Rajasthan and Gujrat (which are 4-10 km wide). Channels along the Aravali hills do not signify the description of the River Saraswati in the Rigveda, hence are considered to be the courses of other smaller rivers/streams.

The First two courses (No. 1&2) of palaeo-channels originating from river Ghaggar and passing through Jaisalmer district and Pakistan (along IB) (with channel courses 4-10 km wide), match the expected width of the Saraswati palaeo-channels. Dr. Hanna Rydh's work at

Rangmahal, done four decades ago, had shown exactly the same. Channel-1 is more prominent and forms well developed river course joining the Rann of Kachchh as an independent river with no major shift along this course. Hence, authors believe it to be the actual Saraswati course.

1.2 Ground Validation

Mapped Saraswati channels have been validated for confirmation of palaeo-channels below ground through a variety of scientific data. Drilling of **14 tubewells** on the image identified palaeo-channels in Tanot-Kishangarh-Longewala-Ghotaru section of Jaisalmer district (Fig.2) indicate that the water quality is quite good (potable water) (Table-1) for most of the drilled wells, as compared to Tube/dug wells. The ground water away from palaeo-channels is, however, saline (non potable) and TDS and fluorides are very high. Investigations by Ground Water Department, Rajasthan indicated palaeo-channels as the storehouse of potable water of good quality.

Sediment analysis indicates palaeo-channels consisting of alternating layers of fine-medium and coarse grained sand and some times with gravel columns, indicating presence of fluvial regime. Coarser sediments are noticed at a depth of 40 – 125 m (about 55-85 m) and have been encountered in 9 of the 14 tubewells drilled. Channels are about 35 to 80 m thick with depth of water level ranging from 35-60 m.

Isotopic studies of water samples by Bhabha Atomic Research Center (BARC) for the samples from the wells existing along the palaeo channels in the Jaisalmer area indicated the presence of palaeo-waters in the channels, no connection of channels with the Himalayan water and absence of modern recharge (Table-2).

As many as 54 sites of Early Harappan and Harappan periods fall in western Rajasthan. These sites plotted on the palaeo-channel map showed most of the Harappan and Early Harappan sites falling along the Ghaggar river, indicating Ghaggar to be the palaeo-Saraswati course (Pl. 2=).

Maps of Indo-Pakistan region prepared by the Italians, Dutch and British authors during 14th–17th Century AD have also been studied. Map "Empire of Great Moghul", published in the year 1746, shows Indus as a parallel river system with a river parallel to it in the east (Fig. 3). This indicates the presence of the dry channels of the Saraswati along which, water flowed occasionally during heavy monsoon or flood events. This situation continued till the 13th century and minor flows existed up to the end of the 16th century (Wilhelmy 1969).

A major validation of existence of mapped palaeo-channels was seen in case of reactivation of the palaeo-channels in Gujarat, during the Bhuj Earthquake of Jun 26, 2000 of magnitude 9.2 that devastated several towns of Gujarat. The palaeo-channels, map prepared by the RRSSC/ ISRO was released about a year before the earthquake hit Bhuj town (Gupta *et al.* 1999). The map showed palaeo-channels passing on the northern and the southern sides of the famous Dholavira site located in the Rann of Kachchh in Khadir island. Satellite images showed that the new channels had formed exactly along the portions of the palaeo-channels shown on the palaeo-channels, map released by the RRSSC/ISRO, indicating that the new channels were merely a reactivation of the buried Saraswati palaeo-channels. The water in the new channels was the water stored inside the buried channels which gushed to the ground due to compression of the aquifer from the strain generated by the earthquake.

1.3 Results

The present findings indicate that the Saraswati flowed as an independent river system parallel to the Indus river and did not change its course and in all probability did not drain through River Nara. Berriyanwala (in Pakistan) route is found on the image as the main Saraswati channel joining the Rann of Kachchh. Earlier Murot route (in Pakistan) was believed to be the actual Saraswati route. The present mapped course of the Saraswati is about 40 km east of the river Nara (Gupta *et al.* 2004). But this has to be verified on the ground also.

The finding also indicates that the river Saraswati never took a course to join river Luni; it never drained along Aravali hills and did not shift its course from east to west, because it is unlikely that a continuously shifting river (over a shift zone of ~500 km from Aravalis to Rajasthan border) may become mighty and with major sites of ancient civilization located along its banks. The archaeological evidence also does not support the presence of Saraswati palaeo-channels in the Luni basin (Misra 1984).

Prominence and the width of the Saraswati palaeo-channels in Ganganagar and Hanumangarh districts, and presence of a large number of archaeological sites of Harappan age, confirms that river Saraswati had its course only through the present day river Ghaggar.

This study also points towards tectonic movements in the Shivalik hills region, due to upliftment of the Himalayas and the changes in climate as the major cause of drainage desiccation in north-western India and drying of river Saraswati and not the upliftment along "Delhi-Hardwar Ridge", and movements along Kachchh fault and Luni-Sukari lineaments. The conclusion is in line with the observations of Krishnan (1982) also supported by Yashpal *et al.* (1980).

The main (westernmost) channel of the river Saraswati (4-10 km wide) remained more or less constant and unchanged and hence the actual Rig Vedic Saraswati river course. The mapped course of Saraswati runs about 850-900 km east, parallel to the Indus river course. The width of the channels mapped in this area varied from 4-10 km as against the observed width of today's Indus flood plains



Fig. 2: Palaeo-channel map of part of western Rajasthan showing locations of tube-wells drilled along the channels

of the order of about 25 km. About 35% of the lower course of River Saraswati falls in the territory of India and the remaining portion is located in Sindh and Bahawalpur provinces of Pakistan.

Coarse resolution data (188 m) from IRS P3 WIFS and 55 m data from IRS P6 AWIFS sensors was found to be extremely useful for mapping the major channels of River Saraswati. Piecewise linear stretching technique was extremely useful in enhancing signatures of the palaeo-channels of the River in sand covered and vegetated areas.

2.0 Saraswati Palaeo-channels in Gujarat

Prima-facie a look at the channels delineated from IRS WIFS data indicates the Saraswati ending in the Rann of Kachchh in Pakistan area; however, a few channels west of Munabao appear to have originated from the Saraswati

main course and they continue southwestward, bifurcate and take a southeastward turn towards Dholavira/Khadir island where one channel passes south of Dholavira whereas the other north of the Dholavira and Bodrani. These channels finally meet at the mouth of the Gulf of Kachchh, south-east of Surkotada (Pl.1). A few channels again originating from Saraswati main channels, south of Munabao and from Saraswati-Luni Delta, area seem to continue towards Surkotada in Gujarat and meet the Gulf of Kachchh as above. At the present level of evidence and understanding it is difficult to visualize that the Vedic Saraswati itself discharged to the Gulf of Kachchh but at the same time one cannot totally rule out the possibility. More work is required to be done in this regards. A more detailed study of the Saraswati palaeo-channels in Gujarat is still in the process.

3.0 Work Done in Haryana

Palaeo-channels have been mapped by us in Haryana using IRS AWIFS data and Radar images. Northern and northwestern districts of Haryana, where occurrence of palaeo-channels has been observed on satellite images have only been studied for the purpose. The study area includes the districts of Yamuna Nagar, Kurukshetra, Jind, Hissar, Sirsa, Kaithal, Karnal, Fatehabad, Bhiwani, Sonapat and Panipat. The main problem faced in mapping of Palaeo-channels in Haryana has been the dense network of artificially constructed canals all over the State making it very difficult to differentiate palaeo-channels' signatures from those of the canal network. Confusing network of interlaced channels running

NS and NE-SW is observed in these districts. Palaeo-channels mapped in the NW part of Haryana which are mostly continuous and long in of belong to the Ghaggar (Saraswati system) and those in the middle part of the State with disposition in the NE-SW direction seem to belong to the Drishadvati river system.

Overlay of the litholog (sedimentological) data from the peizometer key wells maintained by the Ground-Water Cell, Government of Haryana indicate three different sediment patterns in the studied area. Occurrence of Coarse sediments, including Gravel and Pebble, in the foothills zone near Yamuna Nagar, occurrence of mostly medium sands in the middle zone, comprising of the districts of Kaithal, Karnal, Pampat, Kurukshetra and the eastern part of Jind and mixed zone of coarse sand, gravel and pebbles in Hissar, Sirsa and the western part of Jind districts. Overlay of archaeological sites on palaeochannels shows alignment of many Harappan period sites in the region occupied by the Drishadvati River System. Specific studies on the Sarasuti (Saraswati *mula*) river, originating from

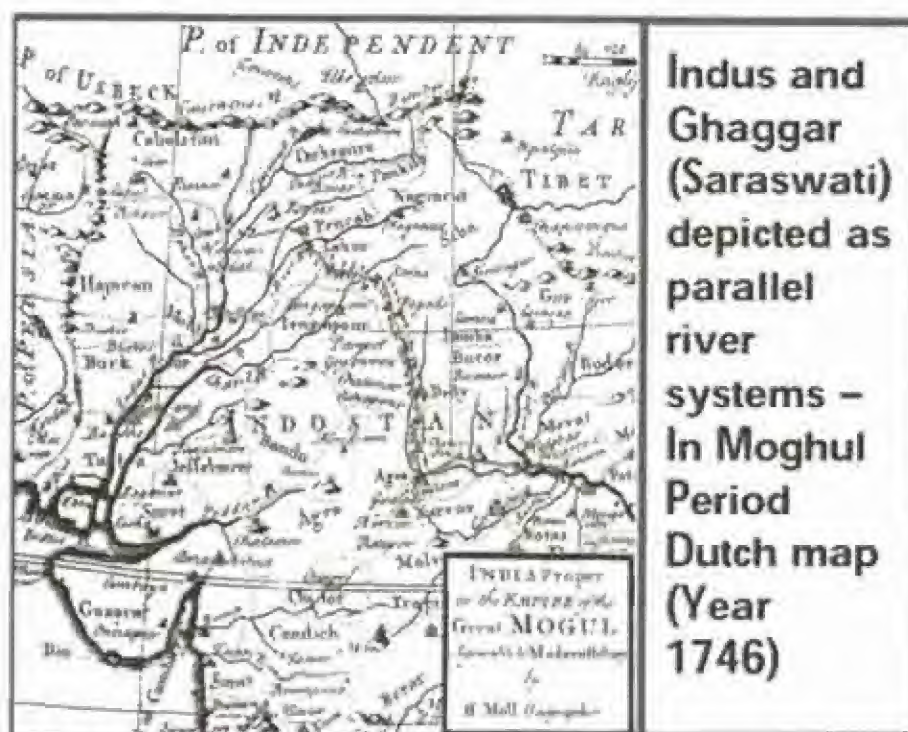


Fig 3

near Adihadri, have also been carried out which showed alignment of temples and historic places and locations along the Saraswati *nala* indicating it to be a historically important channel. Studies on analysis of rock samples collected from Adihadri area for identification of origin of transported boulders found in the ABR sites, rainfall data analysis, water sample analysis for the samples collected from Kalayat, etc. have also been carried out, under the present study, indicating water woozing out at Kalayat was from the palaeo-channel forming the aquifer below and not from the neighboring adjacent pond.

Results of the studies in Haryana are yet to be given the final shape in respect of the exact Saraswati river course based on the analysis carried out on the available scientific data *vis a vis* palaeo-channels' signatures.

4.0 Recommendations

Palaeo-channels of Saraswati mapped under the study apart from their ground-water potential, would also be useful for the archeological investigations along the channels where new settlements of Harappan age are likely to be found buried below the sands of the Thar Desert. Placer mineral deposits of heavy metals and radioactive minerals are also likely to be found along the Saraswati palaeo channels.

Sum up

Results of an interdepartmental research work aimed at solving the controversy regarding the course and existence of a prehistoric palaeo-river known as "Saraswati" buried below the sands of the Thar Desert are presented in the paper. River Saraswati originated in the Himalayas and dried up during 2000-1500 BC, mainly due to tectonic and palaeo-climatic changes. Varying number of courses of the river have been suggested by different workers. The obscured channels of the river could be seen on the images from present day satellites. By using multi-spectral data from new generation (Indian) satellites/sensors IRS WIFS, LISS-I and LISS-3/ PAN, efforts are made to reconstruct the true course of the river and validate

the same through a variety of scientific data generated under the project by different agencies, viz. remote sensing data, data from core drillings and isotopic studies; data on ground water quality, yield, depth and age of ground water; litholog and sedimentological data, archeological finds, geomorphological data, historic maps, etc. Reasons responsible for disappearance of the Saraswati are also analyzed.

Results indicate different reasons responsible for its disappearance. Our analysis indicates that the "Rise in Himalayas and consequent displacements in the Siwaliks and its foot-hills region (in the form of Yamuna and Satlej tear faults)" and not the "Rise along Delhi-Hardwar Ridge and movements along Kachchh fault and Luni-Sukari lineaments with resultant westward slope changes", as suggested / believed by earlier workers, was the main cause for ultimate drainage desiccation in the north-western Indian region. The results indicate that the river Saraswati drained through the present day river Ghaggar and did not drain along the Aravali hills in Rajasthan. Also it did not shift its course drastically and continuously from east to west, as suggested by earlier workers. The image anomalies indicate that the river Saraswati flowed parallel to the river Indus as an independent river system (closer to the north-western Indian border) but did not flow through the present course of river Nara. The mapped courses of the Saraswati runs about 850-900 km east, parallel to the Indus river course.

The course reported has been mapped with details as never before. That the course is continuous, and also shows details of the channels with branching and loops, can be seen through naked eye and, is significantly different from the one reported by earlier workers. Existing controversies regarding the 1) exact course of the river Saraswati in Thar Desert region, 2) continuous westward shift of river Saraswati from initial position near the Aravali hills in Rajasthan to its final position closer to the northwestern International border, and 3) possible cause of disappearance of the river Saraswati and drainage desiccation in NW India have also been resolved. The work for demarcation of the

Saraswati course has been completed in Rajasthan state (including parts falling in Pakistan) and is in different stages for Gujarat, Haryana and Punjab. Details are discussed here.

Acknowledgements

Authors are thankful to ISRO for permitting to carryout this study and to GWD, Rajasthan and CGWB Bangalore for providing hydrogeological and drilling data including results of isotopic studies by the BARC, Mumbai. Archaeological data published in Posschl 2000, and more and fresh data collected by the Rohtak University are being used.

Table -2: Ground water ages of the samples collected along the palaeo-channels in Jaisalmer and Ganganagar districts, Rajasthan*

ID No.	Location	Well type	δH (TR - 0.5)	$\delta^{13}C$	$^{14}C \pm 1\sigma$ (pMC)	Age (BP) (σ), UC	Model Age, σ (Pearson)
Jaisalmer samples							
D1	Dharmikua	DW	2.1	-9.6	79.5 (2.2)	1900	m
T1	Kishengarb	TW	0.3	-5.7	47.3 (1.4)	6190	m
D3	Kuriaberi	DW	0.5	-8.3	58.8 (1.6)	4390	[340]
D4	Nathurakua	DW	0.3	7.9	69.3 (1.8)	3000	m
T2	Ghantiyali	TW	0.5	-4.0	31.2(1.2)	9630	550
D5	Ghantiyali	DW	0.6	-	54.9 (1.5)	4960	-
D7	Gajasing ka tar	DW	2.1	-7.7	64.9 (1.9)	3570	m
T3	Ramau	TW	0.6	-7.4	48.8(1.5)	5930	1930
T4	Sadewala	TW	0.4	-7.7	6.6 (0.7)	22450	18800
T5	Lrangewala	TW	0.4	-5.6	10.4 (0.9)	18700	12400
T7	Ghotaru	TW	0.4	-7.3	20.7 (1.0)	13000	8910
D12	Ghotaru	DW	1.1	-	62.7 (1.7)	3860	-
T8	Asmar	TW	0.4	-7.5	36.1(1.3)	8420	4540
D14	Langtala	HP	0.3	-6.1	68.6(2.0)	3120	m
D15	Langtala	DW	1.0	-	64.8(1.7)	3590	-
D17	Dostmoh. Kua	DW	1.0	-7.6	49.7 (1.5)	5780	2000
D18	Mituwala	DW	0.6	-11.0	57.9 (1.7)	4520	3800

DW: dugwell; TW: tubewell; DCB: Dug cum Bore well; TR: Tritium ratio; pMC: Percent Modern carbon; UC: uncorrected; m: modern

* (Source: Ground Water Department (GWD), Govt. of Rajasthan, Jodhpur. Data analyzed by the BARC, Mumbai, for the GWD)

Table - 1 : Data of the tube wells drilled along the palaco-channels in the Jaipur district

(Source : Ground Water Department, Government of Rajasthan, Jaipur)

Sl. Drilled Site No.	Year Of Construction	Yield (lph)	Quality (EC) TDS figs.in brackets	Depth Drilled (m)	Static Water	Structure Installed Level (m)	Aquifer material as observed in lithology
1 Tanot 3.5 Km from Ghaniyali to Tanot LHS of Road	1999-2000	11250 by compressor	4400 (2650)	125	33	Tubewell	Mainly fine grained sand, medium grained at some levels
2 Ghotaru-I 12.5 Kms Ghotaru to Longewala	1999-2000	13500 by compressor	10800 (6506)	151	43	Tubewell	Medium to coarse sand and gravel Out of main channel
3 Ghotaru - II 14.5 Kms Ghotaru to Longewala	1999-2000	Not Developed	-	151	-	-	Fine grained sand -sandstone chips -fine grained S.St.-Kankar Out of main channel
4 Ghotaru - III 10 Kms from Ghotaru to Longewala. RHS of road	1999-2000	2250 by compressor	7200 (4337)	151	48	Tubewell	Fine grained sand -very coarse grained gravelly sand
5 Ghotaru - IV 3 Kms from Ghotaru to Longewala. RHS of road	1999-2000	32400 by pump	5900 (3554)	151	45	Tubewell	Medium to fine and coarse grained sands
6 Ghotaru - V 150 m NE of Fort	1999-2000	33750 by pump test	2550 (1536)	148	33	Tubewell	Coarse gravelly sands, fine to medium grained sands and occasional clayey sands
7 Ghotaru - VI 1.5 Kms from Ghotaru to Asotar. RHS of road	2000-2001	22500 by pump test	1550 (934)	125	46	Tubewell	Dominantly medium to coarse sands, fine grained and clayey sands at few levels
8 Dharini Khu 3 Kms from Kishengadh to Dharini Khu, RHS of road	2000-2001	35100 by pump test	1700 (1024)	151	40	Tubewell	Fine and medium grained sands
9 Ramau - I * Ramau-Tanot Road -2 km from Ramau on LHS of road	1998-1999	9120 by compressor	1676 (1010)	102	42	Tubewell	Fine grained sand and silt with kankar; fine to medium sand
10 Ramau - II * Close to Ramau village. RHS of Tanot road	1998-99	18240 by compressor	1660 (1000)	120	58	Piezometer	N.A.
11 Kartha * Ramau and Tanot road 9.5 km from Ramau LHS of Road	1998-1999	12312 by compressor	2990 (1800)	125	42	Piezometer	Mostly Fine sand
12 Nathura Kua * 4.5 Km from Tanot, 250 m RHS of road	1999-2000	12768 by compressor	4410 (2656)	120	36	Piezometer	Fine grained sand and silt with kankar
13 Kutia Beri *	1998-1999	12768 by compressor	2150 (1295)	131	32	Tubewell	Mostly Fine sand
14 Ghanthyali I * 500 m from Ghanthyali Mandir to Tanot, LHS of Road	1998-1999	11400 by compressor	3650 (2200)	130	62	Piezometer	Fine grained sand

Note : Yield by pumps are normally higher than the compressor yield by a factor of 1.5 to 2.0 * Wells are drilled by the CGWB

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NOTES AND NEWS

Recent Exploration of Harappan Sites in District Rohtak, Haryana

While removing the sand from the sand dunes adjacent to the village Bedwa, Tehsil Meham, District Rohtak, the villagers stumbled upon a lot of human bones and pottery of ancient times. They contacted Appu, a student in the Department of History, M.D. University, Rohtak. At his instance, site was visited and antiquarian remains were examined by the teachers and students of the Department. It became clear that the remains belonged to a cemetery of the Harappan period. In order to have a fuller view of the chronology and other aspects of the discovery, the present author planned to conduct a micro-level archaeological exploration in and around the village in question. Since generally some habitation site(s) is expected near a burial site it was decided to search such a place also. Our search located as many as six sites in this area, most of which were placed on the archaeological map of India for the first time.

Area of Present Studies

We confined our investigations to a limited area, i.e., between $76^{\circ}15'$ to $76^{\circ}20'$ E and between $29^{\circ}02'$ to $29^{\circ}04'$ N. Physiographically, the area is a flat plain with average height ranging between 218 to 223 m from the Mean Sea Level. It slopes gently from the north-east to the south-west although there is a deep depression running in the same direction which is flanked by a chain of sand dunes. On the very face of it, it was the dried up course of some river.

The area of study has a number of villages, many of

which fall in the Rohtak District. However, the north-western portion of the area (e.g., village Puthi Seman) falls in the Hansi Tehsil of Hisar District. The villages Bedwa, Kanghanwala, Seman, Bhaini Badali, Baari Bhaini and Bhaini Surjan form part of the Meham Tehsil of Rohtak District (Fig.1).

Earlier Work

The earliest archaeological explorations were conducted in this area by Suraj Bhan when he was conducting the excavations at Mitathal in the year 1968. He followed the deep depression running along the site and discovered not only two sites in the village Farmana but also Rakhigarhi. Of the two sites referred to by him, Farmana-1 had yielded the Early Harappan remains, akin to early Siswal, while Farmana-2 yielded Early Harappan remains of degenerate Siswal type (Bhan 1974:125). But the scholar did not furnish any other information regarding the location and the size of any of these sites. Later on, the area was once again explored by Surender Singh, an M. Phil. student of M.D. University, Rohtak. He gave more information about the sites, their location, size, etc. (Surender Singh 1989 : 16-18), but his account is not accurate as far as the area of the sites is concerned. The present author kept in mind these deficiencies while undertaking the investigations.

Farmana 1 ($29^{\circ}04'14''$ N; $76^{\circ}17'10''$ E)

The village Farmana is situated at a distance of about

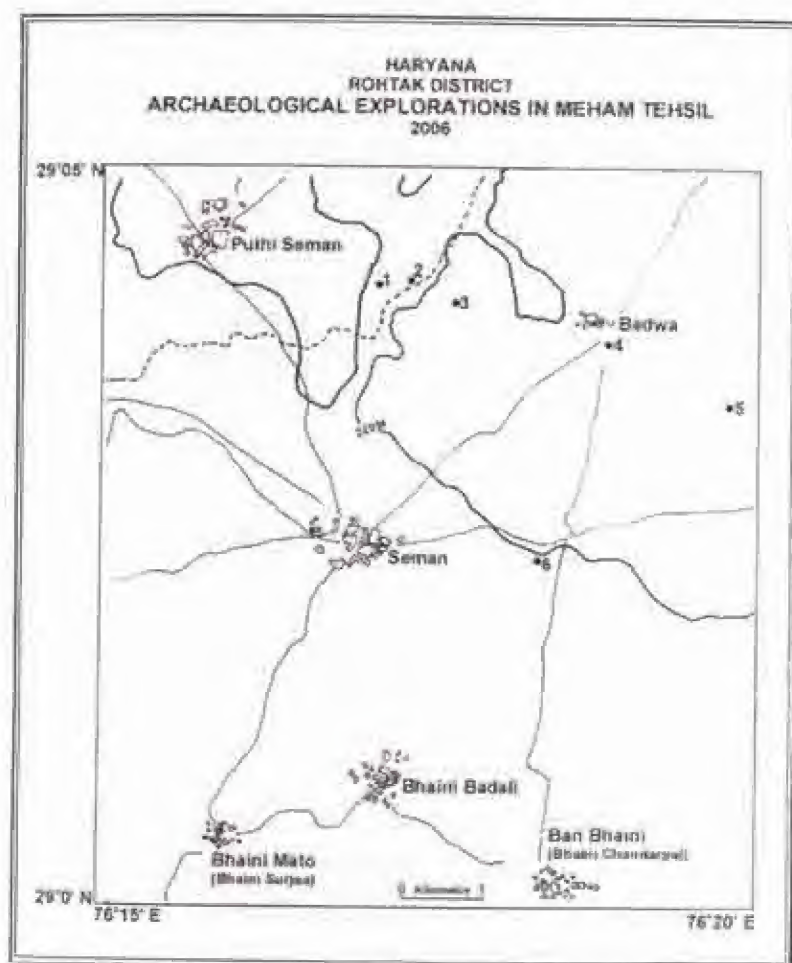


Fig. 1: Archaeological explorations in Meham Tehsil, Rohtak District (Haryana)

14 km from Meham, the tehsil headquarters in District Rohtak, Haryana. It is approached by road from Meham. The site is located about 2 km. west of the village and is called 'Daksha Khera'. This site falls in the revenue jurisdiction of three villages, viz. Farmana, Seman and Bhaini, but since the major portion of the site falls in the village Farmana, we include it in Farmana (Map1: Site No. 6). Surender Singh gave the size of the site 250 x 250 m and reported Early Harappan, Mature Harappan, Late Harappan, OCP, and Early Historic remains (Surender Singh 1989: 17). But in fact it is a much bigger site. According to the revenue records, the mound spreads over an area of 10 hectares. The whole site is under cultivation although it rises to a height of about 3 meters from the

surrounding fields. During the course of our explorations, the site has yielded the remains of Early Harappan as well as Mature and Late Harappan pottery. In addition to this, some potsherds of 'Hakra Ware' belonging to the earliest stage of the Early Harappan Period were also found. Though the site is very extensive, it is very poor in antiquities. Only terracotta bangle pieces and beads and cakes were found in good quantity, while faience, steatite and lapis-lazuli specimen are quite rare, may be because much is buried deep in the sand deposit. Towards the eastern side of the mound the villagers have removed a part of this mound and levelled it for agricultural purposes. It is here that the Early Harappan pottery is found in abundance (Fig. 2).

Farmana 2 (29°04'19" N; 76°17'22" E)

Another site located in the area of the same village is called 'Girori Khera' which is located at a distance of about 2 km south-west of village Bedwa. Some portions of this site have also been levelled. In fact, the whole area of this site is under cultivation. Suraj Bhan had reported degenerate Siswal type remains from Farmana-2 (Bhan 1974: 125).

But in the absence of any detail given by him, it is not possible to know whether this is the same site (Farmana-2) or he had referred to some other site. Later explorations yielded only medieval remains from Farmana-2 (Surender Singh 1989: 17-18). According to his estimates, the site is 230 x 200 x 4.5 m in size, but according to our calculations, the site is about 4 hectares in size and rises to a height of 2 m from the surrounding field level. The present effort brought to light only a few sherds of the Mature Harappan pottery while the Late Harappan pottery is slightly more conspicuous (Fig. 3 & 4). Apart from pottery, some faience and terracotta bangle pieces of Harappan tradition were found. In addition to this, Kushana pottery and brickbats, and also some medieval remains

were also found (Fig. 1; Site No. 5).

Bedwa 1 (29°02'22" N; 76°18'23" E)

The village Bedwa is located at a distance of about 13 km north of Meham town; it is approached by a road, which bifurcates from the Meham-Julana road. There are at least three ancient sites in the jurisdiction of this village. Of these, Bedwa-1 is located at a distance of 2.5 km east of the village, to the left side of Bedwa-Puthi road. It occupies an area of about 2 hectares and is now 3 m high. The whole area of this site is under cultivation. Painted Grey Ware and associated red ware can easily be picked up from this site. This site is not recorded earlier (Map 1; Site No. 3).

Bedwa 2 (29°04'04" N; 76°17'45" E)

There is another site, about 300 m south-west of the village in the sand-dunes from where the villagers have been removing the sand for quite sometime for commercial purposes (Fig. 1; Site No. 4). It was here that the villagers noticed bones and pottery at some places. It was found that the pottery belonged to the Harappan tradition. With subsequent observations, the site was tentatively ascribed as a Late Harappan cemetery site. During the course of investigations, at least 14 graves with grave-goods were noticed (The Times of India, March 19, 2006). The bodies were laid in the extended position on their back in the north-south direction with head towards north. Near the heads were found placed grave-goods, mostly in the form of pots of various shapes and sizes: bowls, dish-on-stands and *loti*-shaped pots, in particular. Normally only four pots were kept with each grave, but at times, more than four pots were also found placed. Dish-on-stands found here are of long-stemmed variety, whereas vases are elliptical in shape. In addition, some perforated jars and spherical collarless pots, miniature pots, small beakers, etc., were also found. Though most of the pots are unpainted, certain amount of painted pots are also present. Paintings are mostly in the form of black bands of various widths, painted on the neck or body of the pots. One collarless pot is found to have whole of its body painted with various motifs, including a peacock and other floral designs. This pot contained the

ash and bone fragments and hence we can call it as a 'funerary urn'. Several of such pots were reported at the site by the villagers but we could not get first-hand information about them and their contents. Thus we can conclude that both types of burial customs – complete burials as well as fractional burials – were in practice as at Harappa. The evidence from this site indicates that cremation of the dead body had also started as recorded by A. Ghosh at Tarkhanewala Dera in the Saraswati basin. Here the ash and few selected bones were found buried in urns. Earlier, Joshi had also postulated that the Harappans practiced a number of burial practices and post-cremation pot burial is one of them (Joshi 1990: 370). Chronologically, most of the pottery found from the site seen to belong to the Late Harappan variety but some of the pots do show the presence of Early Harappan tradition. In addition to this, some elements of Mature Harappan phase are also there in the form of long-stemmed dishes-on-stand, perforated jars and even beakers, etc. Thus, it is quite clear that only systematic excavations will help in establishing the stratigraphical positions of these stages of the Harappan Civilization in Haryana.

Puthi Seman 1 (29°03'47" N; 76°18'52" E)

The village Puthi Seman (Tehsil Hansi, District Hissar) is situated at a distance of about 20 km from Meham town and is approachable from Farnana (Fig. 1; Site No. 1). There are two ancient sites in the revenue jurisdiction of this village: Site-1 is located about 2 km west of the village, and about 200 m away from the Puthi Seman-Bedwa road. Here also were found the remains of a Harappan cemetery, similar to the one found in village Bedwa. This site was initially spread over an area of about two acres but now only some parts of the mound are visible as this site was also subjected to the removal of sand on large scale. There was no habitational area here at this site since the entire area is dotted with the Harappan graves, like the site of Samnali in the Baghpat District of U.P., recently excavated by D.V. Sharma (2004:35-44) of Archaeological Survey of India. Chronologically, this site also belongs to the same period as the site of Bedwa, as is evident from the contents found from the graves.

Puthi Seman 2 (29°03'17" N; 76°19'45")

Located at a distance of about half a kilometre west of Puthi Seman 1, lies another site, which is located near the border of Rohtak and Hissar districts. This site is of about 2 hectares in size and is presently under cultivation. It has yielded the remains of Kushana period, as is evident from the discovery of pottery and bricks of that period (Fig. 1; Site No.2); however, excavations may bring to light the remains of other cultural periods.

Discussion

The recent discovery of two Harappan cemeteries in Haryana and one in U.P. has raised a few questions. The first of these is that at these sites no habitational remains have so far been found whereas the Harappan cemeteries are found at sites like Harappa, Lothal, Kalibangan, etc. in the vicinity of the habitational areas. At Harappa, the cemetery lies about 250 m to the south of mound AB (Vats 1940: 203). This cemetery, located near the museum at Harappa and named R-37 (Wheeler 1947: 83), was initially brought to light by K.N. Shastri in 1937 and belongs to the Mature Harappan period. Of these burials, the excavator had identified two strata, of which the earlier stratum (called Stratum II) had the complete burials, with bodies laid on the back in the extended position oriented in the north-south direction, with head towards the north; while the later one (called Stratum I) had fractional burials (Vats 1940: 220-240).

At Kalibangan, the cemetery lies about 200 m west-south-west of the citadel area (Lal 1997:124). At Ropur also, the cemetery lies in the close vicinity of the habitational area. The excavator has identified three mounds here, viz., northern, southern and the western one. Of these, the western mound is Harappan cemetery (Sharma 2001: 39). At Surkotada, Joshi has identified a Harappan cemetery located to the north-west of the settlement (Joshi 1990: 365). Similarly at Lothal, the cemetery is in the north-west of the settlement (Rao 1979: 136). Some 25 km from the cemetery sites of Bedwa is Rakhigarhi, where also there is a cemetery, about 200 m from the habitational site (Nath

2001: 46). Here seven locations were identified by the excavator of which site or location no. 7 is a cemetery.

Keeping all these pieces of evidence in mind, we can conclude that normally the cemeteries are found within 250-300 m of the habitational area. Hence, there should be habitational areas in the close vicinity of both the sites. In order to find these missing sites we explored the adjoining areas. At Puthi Seman, we could not locate any mound but the local people told us that in the close proximity of the site there was another mound which was completely removed by the villagers in order to bring the area under cultivation. Since this area was under cultivation at the time of the explorations, no remains could be identified. At Bedwa village, another site lies about 250 m from the village (named Bedwa 3 for our convenience). This one is under habitation and the antiquity of this goes only upto the medieval period; no Harappan remains have been located so far. Thus, on the basis of the locational evidence, we can safely conclude that the Harappan levels may have been sealed under these remains and some day some chance discovery may bring them to light.

Another point which needs attention is that as at Harappa both complete burials and fractional burials were in practice in this region. As we have seen earlier, complete burials belong to the Mature Harappan phase whereas the fractional burials belonged to the later phase. At Bedwa were found both the types of burials in the same level. So, on the basis of this evidence, we can date them to the later half of the Mature Harappan phase and early part of the Late Harappan phase, when both the practices were prevalent. Even the pottery found from these graves has mixed assemblage containing both Mature and Late types. Here we would like to refer to a similar discovery from village Sanauli, which is located on the Barot-Chhaprauli road in Baghpat District, Uttar Pradesh. Here a cemetery, claimed to be of Late Harappan times, is being excavated. Interestingly at this site no evidence of habitation has been found so far (The Times of India, July 3, 2006). The explorers have reported that the pottery assemblage so far recovered is that of the Late Harappan style, showing a

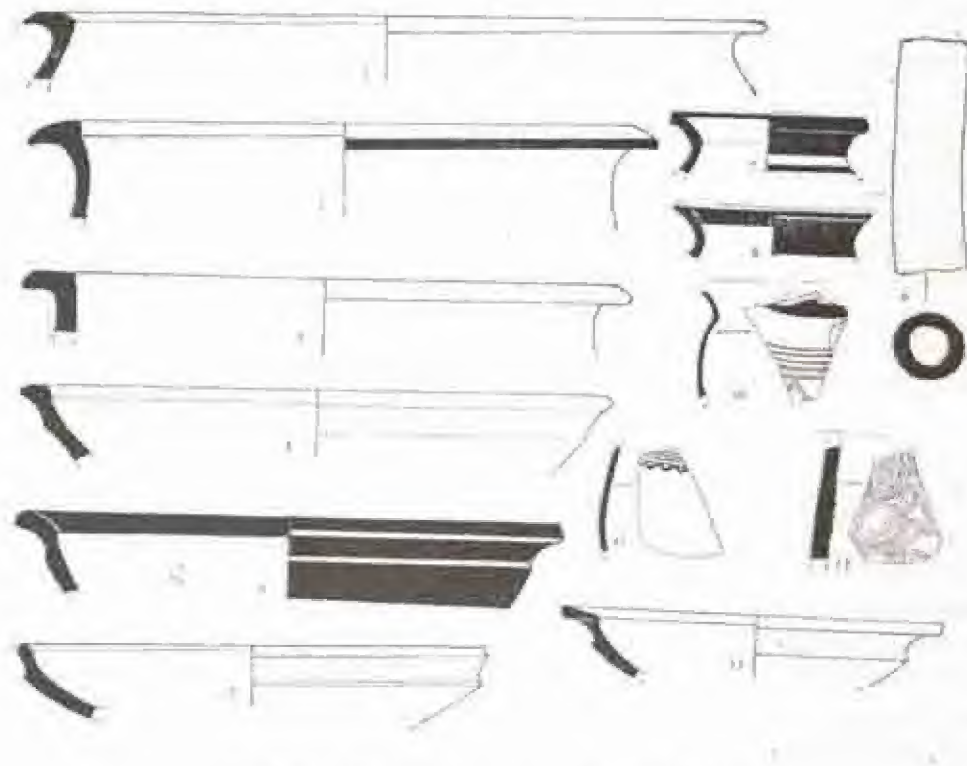


Fig. 2: Early Harappan pottery from Furrmana, Rohtak

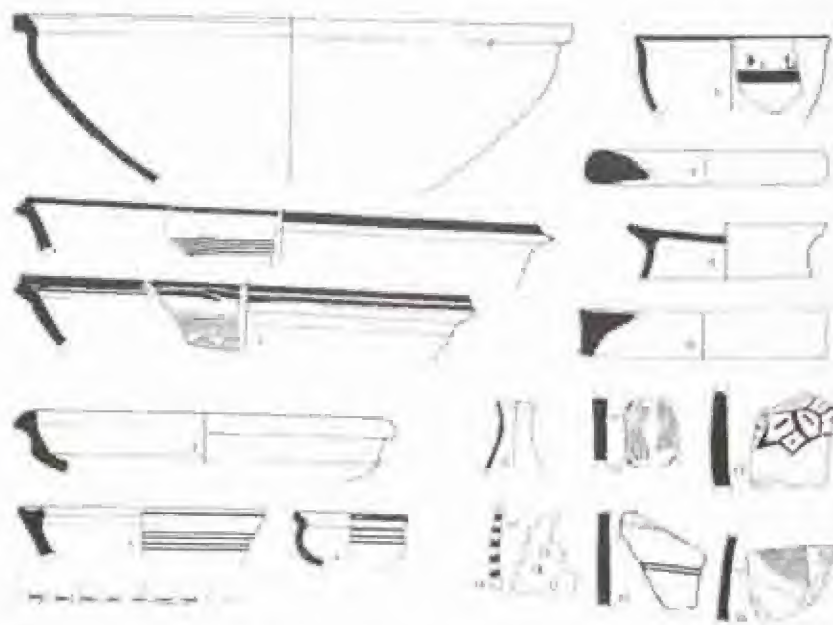


Fig. 3: Mature Harappan pottery from Furrmana, Rohtak

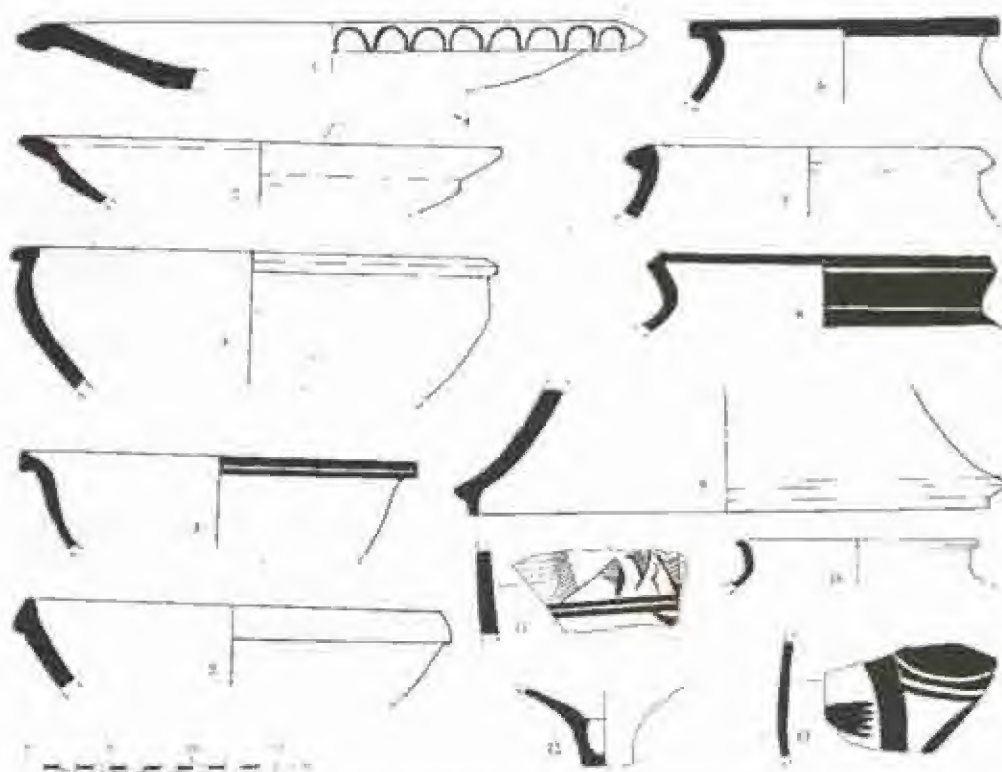


Fig. 4: Late Harappan pottery from Farmana, Rohtak

complete absence of classical Harappan types. The pottery is devoid of any paintings and pottery types show striking similarities with the Bara pottery (Sharma *et al.* 2004: 38). The sites being discussed here differ from Sanauli in two respects: 1) Unlike Sanauli, Bara-type shapes are not found here; and 2) there are no painted pots found so far at Sanauli, but there are a few at these sites. One pot found here has beautiful paintings in black colour recalling the 'Cemetery H' tradition (Pl.). The pottery at both Bedwa and Puthi Seman, though of Late Harappan variety, has some Mature Harappan elements. The dishes found here have flaring rims and dishes-on-stand are of long stem variety unlike the Late Harappan specimens. On this basis, we can conclude that the Mature Harappan elements survived even during the Late Harappan phase. Thus, these graves can be dated to late phase of the Mature Harappan period and early phase of the Late Harappan period. This is not an isolated phenomenon although; in this region there are plenty of Harappan sites, mostly rural ones and generally

showing non-Mature Harappan elements, with the conglomeration of Early and Late Harappan elements. The Early Harappan elements continued even during the Mature phase at these rural sites, even though some of these came into contact with the Mature Harappan. These same rural sites survived beyond into the Late Harappan period. They maintained their distinct ceramic traditions in this region. In other words, the Early Harappan traditions in pottery continued through both, the Mature and Late Harappan times. Similarly, the Mature Harappan traditions in pottery also continued in the Late Harappan pottery complex. And this is quite understandable.

Another striking feature of the cemetery sites at Bedwa and Puthi Seman is that the burials are found deep into the sand dunes. This practice is not confined to these sites only. Recent explorations conducted by Vivek Dangi and Appu have yielded the evidence of similar burials at a number of other sites, where Bedwa-type pottery and skeletons

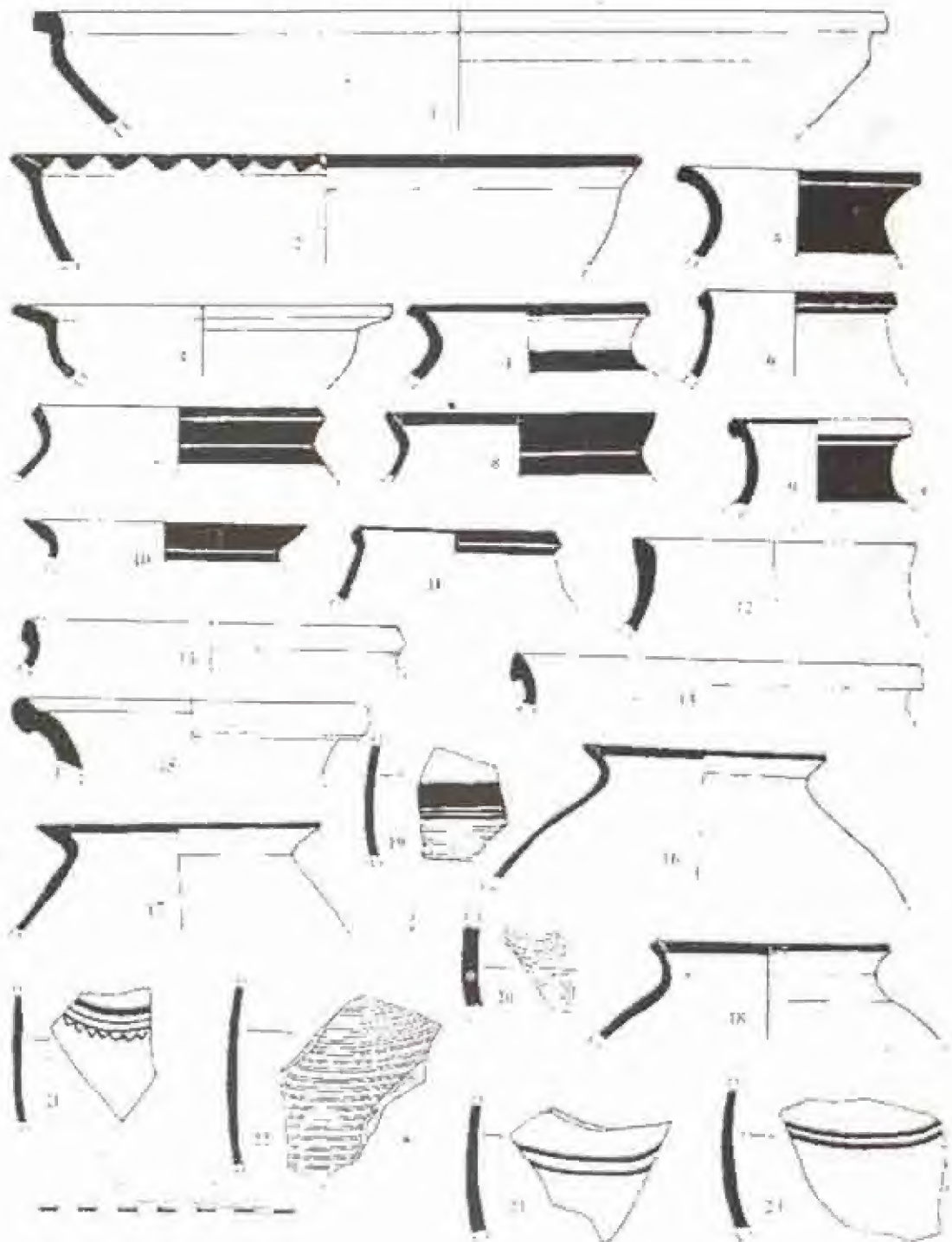


Fig. 5: Early Harappan pottery from Bodwa, Rohtak

are found. It is quite an interesting feature as the Harappans may not have wanted to utilize the rich agricultural land for the un-productive ceremonial purposes. This may be due to the increased pressure of population as we have shown elsewhere that in this region the concentration of sites is quite high as is evident from the discovery of a large number of Harappan sites (Mammothan Kumar 2004 mas). In the Saraswati/Ghaggar-Yamuna divide are found 865 Harappan sites and if we compare these with the modern villages we can very well see that during the Harappan times also there was much pressure on the agricultural land. In the year 1981, the total number of villages in the area between the Ghaggar and Yamuna (roughly corresponding to the modern day Haryana) was 6745 (Census of India 1981), whereas in the year 2001 it rose to 6781. (Census of India 2001).

Apart from these cemeteries, the habitation site of Farmana I needs special attention. This site is quite big in size and qualifies to be termed as a town site or a small urban centre. In the Ghaggar-Yamuna divide more than 95% of the sites are less than 5 hectares in size, and can be termed as 'villages'. The location of this site is also very important as it lies at a distance of 24 km from Rakhigarhi. This place might have provided the services to the surrounding territory and may have grown in size due to the growing needs generated by the surrounding villages. But this was not a full-fledged urban centre, as is evident from the poor material remains found during the course of

archaeological explorations. This type of settlements, functionally are perhaps 'primary type' (Mammothan Kumar *et al* 2004:26). If systematic excavation is conducted at the site, it may throw light on the rural - urban interaction and also the role of intermediary small-town sites like Farmana. Such sites might have catered to the needs of the surrounding rural villages and also provided food items and raw materials to the industries situated in the urban centres. This site can be compared with a *mandi* or a market-centre in today's parlance. Even during the Harappan times, such sites had an important place in the Harappan market network.

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Burial Pottery

Burial Pottery



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Camps of the Early Settlers in the Sub-Basins of the Chambal River, Rajasthan—An Observation

The south and south-eastern part of the District Baran of Rajasthan has been chosen for exploration in order to understand the nature and formation of the prehistoric cultures of this area. The area under exploration is an extension of the Malwa plateau of Madhya Pradesh that comprises of both low hills and undulating plains, surrounded by a line of the Vindhyan Range in the form of semi-circle which comes from Madhya Pradesh covers the lower middle part of Chhipa Barod Tehsil to its south and goes upto Chhabra and Atru areas (Fig. 1). This geomorphic unit is having an elevation of 300-450 m, with a general northerly slope as indicated by the direction of flow of rivers that drain the area. The area is served by the sub-basins of Chambal River. These sub-basins include Lhasi River and its catchment area in the Chhipa Barod Tehsil, Parvati River basin in the Chhabra Tehsil of Baran District and Parwan River basin in the Aklera Tehsil of Jhalawar District.

The area of present investigation is covered with fairly dense and open mixed forests, having a number of wild varieties of edible flora and fauna, which must have compelled the hunter-gatherers in the past to make temporary camps on the widely exposed gravel or pebble beds of the rivers, surrounded by the low Vindhyan Range. This gravel bed supplied an unlimited amount of raw material like quartzite, sandstone, and basalt for making Lower & Middle Palaeolithic tools. However, during the later times, the Upper Palaeolithic and microlithic tools were mainly made on chert, agate, jasper, chalcedony and quartz.

Keeping in view such a geomorphological background, the following sites of archaeological importance have been explored with available geo-coordinates in different Tehsils as mentioned above, i.e., Chhipa Barod and Chhabra in Baran and Aklera in Jhalawar District in Rajasthan. In this context it may be noted that the tool bearing horizons or findspots are located near to the respective villages; hence, these sites have been named after the nearest villages.

Chhipa Barod Tehsil—District Baran

The village Amarpura is situated at a distance of 4 km southwest of Patalpani. The whole area is covered with very fertile black cotton soil that is surrounded by the low Vindhyan Range. Actually it is a synclinal valley where a large number of boulders has assembled after rolling down from the nearby hill and raw material like chert, quartz, etc., have come up as an outcrop through the fissure of trap rock that spread here and there. The area has yielded Upper Palaeolithic tools like blades, points, and microliths like scrapers, blades, flakes and cores. Similarly, just 2 km east of the State Highway (S.H. 19A) near Sarthal, the village Asalpura has yielded microlithic cores and flakes.

The village Banjari ($24^{\circ} 30' 50''$ N; $76^{\circ} 43' 45''$ E) is situated at a distance of 15 km south of the Tehsil. The area has given Upper Palaeolithic tools like arrowheads, burins, flakes and cores. Microliths include arrowheads, points, scrapers, flakes, etc. About 1 km west of the Banjari is Borkheri village ($24^{\circ} 31' 50''$ N; $76^{\circ} 42' 30''$ E). From this village, Stone Age artefacts ranging from Lower

Palaeolithic to Mesolithic period have been discovered. Among the Lower Palaeolithic tools, cleavers, scrapers, core-cum-scrapers of Middle Palaeolithic period and unfinished arrowheads of Upper Palaeolithic period are mentionable, which are made on quartzite and chert. The microliths include cores and flakes, which are prepared on chert. The village Jhanjhani is located about 6 km west of Banjari. There is a small hillock within this village, on the foothill of which a fair number of microliths including blades, cores and flakes have been gathered.

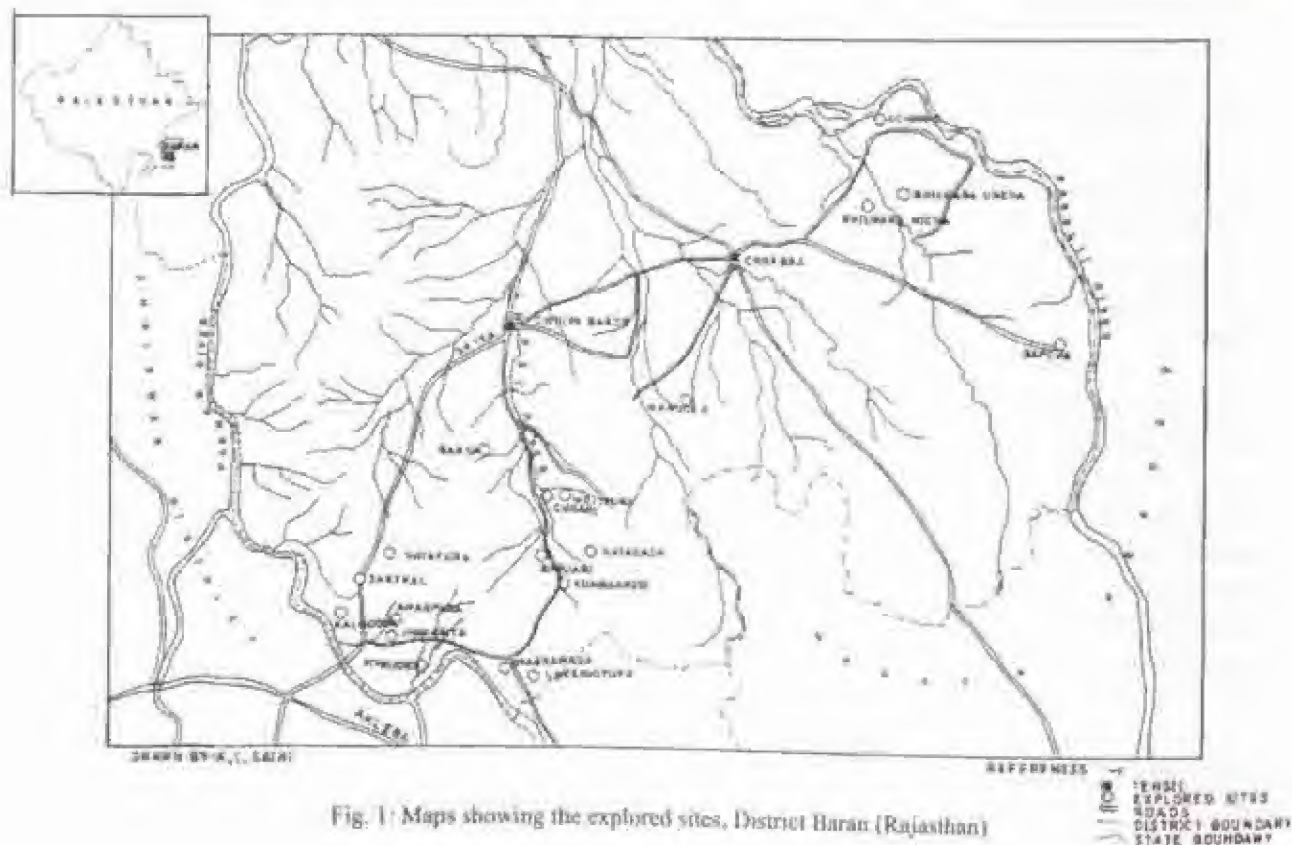
Assemblage of the Middle Palaeolithic to Mesolithic periods have been gathered from the village Barsad ($24^{\circ} 32' 20''$ N; $76^{\circ} 39' 40''$ E). The tool-bearing horizon is a pebble bed mixed with deep brown soil that yields Middle Palaeolithic scraper made on quartzite. Among the microliths, arrowheads, flakes and cores are mentionable.

Situated about 11 km south east of Chippa Barod, the

village Gurari ($24^{\circ} 31' 30''$ N; $76^{\circ} 44' 2''$ E) yields a number of stone tools comprising of Upper Palaeolithic blades, flakes, fluted cores besides microlithic blades, flakes and cores. Village Motipura ($24^{\circ} 31' 423''$ N; $76^{\circ} 44' 30''$ E) is located 4 km south east of the village Gurari, surrounded by the hills. Exploration in and around this region has revealed Upper Palaeolithic tools like arrowheads, scrapers, blades, and flakes. Some microlithic flakes have also been found in this region.

About 2 km east of Bhorkheri comes Haripua ($24^{\circ} 31' 30''$ N; $76^{\circ} 43' 20''$ E) where a good number of microliths have come into existence which comprise of blades, scrapers, points and flakes, made on chert.

The village Jhamria is situated about 1.5 km south of Amarapura. The area is covered with black cotton soil mixed with small pebbles and most of the area is under cultivation. From the cultivated lands microliths comprising of points



arrowheads, blades, flakes and cores have been collected.

The village Kheriar is located about 3 km away from Motipura, where the river Lhasi has formed terraces of mostly angular pebbles. This pebble bed is mixed with alluvium from where Upper Palaeolithic flakes, cores, blades, arrowheads and burins have been collected. A few Middle Palaeolithic flakes, microlithic blades, burins, arrowheads, flakes, etc., were also found.

The village Kumbhakheri is situated 17 km south east of the Tehsil. Being situated on the flood plain of the Lhasi River, most of the area is covered with cultivated land. One small affluent of the River Lhasi is flowing by the side of the village, and the confluence of both the river and *nullah* is about 1 km from the present-day village. Near the confluence, a vast section is observed (Fig. 2) which shows the following stratigraphy:

6. Alluvium
5. Smaller pebbles-jasper, chert, quartz
4. Gravel bed mixed with red soil
3. Inclined lime stone bed-disappeared abruptly
2. Small gravel bed-basalt, sand stone, quartzite
1. River Bed-handaxe

One Lower Palaeolithic handaxe fashioned out of quartzite has been found on the bed of this river (Fig. 2). The surface yields, stone chips of jasper, chert, quartz, etc. However, no microlith has been found.

At Ratanpura, near Kumbhakheri village, the river Lhasi has formed huge terraces covered with deep brown soil and pebbles of different shapes. Microlithic flakes, cores and unfinished scrapers have been recovered from the surface.

Both Upper Palaeolithic and microlithic tools have been found from the village Kolukhera, 2 km south east of Uchakpura village. The village is situated on a mound of approximately 25 m height. A small stream flowing by the

side of the mound ultimately joins with the Lhasi River. The cliff section of the river shows that the gravel bed contains Upper Palaeolithic and microlithic tools which is underlain by alluvium and overlain by the limestone bed. Among the Upper Palaeolithic tools blades, arrowheads, points, scrapers and flakes made of chert deserve mention. The microlithic tools include blades, burins, points, scrapers, flakes, cores, etc.

To the north-west of Lambhakhera lies the village Kherkhajuri from where a small number of microliths like scrapers, points, flakes and cores, which are made on chert and quartz have been encountered.

Situated about 9 km west of Borkheri, the village Kalpa has the remains of Lower Palaeolithic handaxe, Upper Palaeolithic blades, arrowheads, cores, flakes, microlithic arrowheads/points, blades, burins, tanged arrowheads, penknife blades, waste flakes, cores, etc. These tools have been found on a hill slope having a pebble bed mixed with deep brown loose soil.

About 22 km south of the Tehsil comes the village Laxmipura (24° 30' 45" N; 76° 43' 15" E) which has yielded microliths, comprising of borers, points/arrowheads, blades and cores, etc.

Lambakhera (24° 33' 30" N; 76° 43' E) is situated about 3 km south-east of Khajuria. Within this village a mound about 20 m high is located on the meandering course of Lhasi River and surrounded by the low Vindhyar Range. The mound yielded microlithic flakes as well as medieval pottery. About 2 km south-east of Lambakhera, the village Uchakpura is situated on the foothill which is locally called Deodah Dungri. On the slope of the hill, Upper Palaeolithic arrowheads, burins, blades, cores, flakes of various sizes and microlithic blades, cores and flakes have been found.

Mandola, 4 km east of the Tehsil, has yielded the evidences of Upper Palaeolithic tools and microliths on the gravel bed mixed with loose brown soil. The tools are made on chert and quartz. Among the Upper Palaeolithic tools blades, scrapers and arrowheads are noteworthy.

Micro lithic tools include points, cores and flakes.

Village Nayagaon (24° 30' 40" N; 76° 44' 30" E) is situated about 20 km south east of the Tehsil, surrounded by small hillocks. The site has yielded Lower Palaeolithic handaxes, Middle Palaeolithic cores, Upper Palaeolithic blades, points, burins, scrapers, cores and microlithic scrapers, points, flakes, etc.

To the southwest of the Tehsil, at a distance of 14.5 km, village Nayapura (24° 30' 20" N; 76° 37' 20" E) is situated. The area surrounding the village is covered with sandstone, quartzite pebbles mixed with deep brown soil. Lower Palaeolithic handaxes and scrapers have been discovered from this region.

About 1 km north of Lakshmipura the village Piptia Akheraj (24° 31' N; 76° 43' E) yields microlithic blades, arrowheads, flakes and cores.

The Patla Pani/Patal Pani is located about 4 km south east of Nayagaon on a flat-topped hill, covered with pebble and deep brown soil. The undulating tract has revealed microliths comprising of arrowheads, scrapers, points, flakes and core.

Rampur/Rampur village is situated about 7 km south-east of Mandola village. Within the village, there is a low flat-topped residuals the slope of which is covered with shapely pebbles of quartzite and sandstone mixed with deep brown loose soil. Raw materials like chert, jaspers and quartz are also spread on the hill slope. The early man of this area exploited mainly quartzite and chert for making tools. Among the Upper Palaeolithic tools scrapers, arrowheads, blades, points (finished and unfinished) and cores are noteworthy. The microlithic tools include blades, borers, points, arrowheads, scrapers, cores and flakes.

At about 1.5 km east of Jhanjhani village, across the Lhasi River lies Surjpur Khurd, where from the foothill, Upper Palaeolithic blades, burins, microlithic blades, scrapers, points, flakes, and cores have been reported.

Saikur is located near Katmodia village, where lower and Middle Palaeolithic tools have come across during the survey. Here Lower Palaeolithic scrapers, handaxes and Middle Palaeolithic scrapers have been collected.

On the bank of the Garapur Khal, an offshoot of Parwa River, the village Sarthal is situated about 2.5 km south of Nayapura. Here the section of the river shows small gravel bed overlain by the bed rock (basalt) and underlain by black cotton soil. On the surface, microlithic scrapers, lunates, blades and flakes have been gathered.

Chhabra Tehsil—District Baran

Bhilwara Uchaka is located 5 km southeast of Unchawad. Within the village, a small hillock exists. On the slope of this hillock Upper Palaeolithic blades, flakes and microlithic borers, blades, burins, scrapers, points/arrowheads and flakes have been found (Fig.2).

Village Hanwatkhera is situated about 2 km east of the Chhabra Tehsil. The area is an undulating plain, drained by the tributaries of the Parvati River and covered with black cotton soil. Flat-topped residuals are occasionally found here and the total area is surrounded by a line of the Vindhyan range. Here the surface yields Upper Palaeolithic arrowheads made of chert and microlithic flakes made of chert and quartz.

Situated about 2 km north of Hanwatkhera, the village Udupura shows the remains of Upper Palaeolithic tools and microliths. The tool-bearing horizon is a pebble bed mixed with black cotton soil. Among the Upper Palaeolithic tools, flakes and flake-blades are noteworthy. The microlithic tools include scrapers, blades and flakes made on chert and quartz.

The village Unchawad is located about 1.5 km north-east of Chhabra Tehsil, and 2 km east of Bapcha village. The area is located on the bank of the Parvati River. Here the river Parvati is bifurcated from the locally called *Parva Nullah* forming an island like deposition in between. From this deposition, Lower Palaeolithic scrapers, microlithic



Kumbhakheri : Cliff-section of the Lhasi River showing pebble bed



Bhillwara Uchak : Upper Palaeolithic tools and microliths



Uchakpuria : Upper Palaeolithic tools and microliths

Kumbhakheri: Lower Palaeolithic handaxe



Fig. 2: Archaeological remains of the study area

blades, points, lunates, flakes and cores have been discovered.

Aklara Tehsil - District Jhalawar

The village Bamaniakheri is situated about 30 km south-west of Chhipa Barod (across the river Parwan) in Aklara Tehsil of Jhalawar District. The mound of Bamaniakheri is situated about 2 km away from the Parwan River where Lower Palaeolithic handaxes and one Upper Palaeolithic core have been found.

Observation

As far as the prehistoric cultures of Chhipa Barod and Chhabra Tehsil of Baran District and Aklara Tehsil of Jhalawar District of Rajasthan is concerned, it has been observed that the immediate slope of the Vindhyan Range/ Scarps were avoided by the prehistoric people. They exploited only the raw materials of the foothills of residuals, banks of the rivers, *mullakh* and synclines where rain water accumulated the boulders, gravels, cobbles immediately after the rainy season. Sometimes the low flat-topped residuals or hillocks covered with pebbles mixed with either black cotton soil or deep brown loose soil become the implementiferous horizon. Among the stone implements, Lower Palaeolithic, Middle Palaeolithic, Upper Palaeolithic tools and microliths deserve special mention. The Lower Palaeolithic artefacts have been found mainly from the Lhasi River basin which are characterized by mostly angular materials, commonly observed in semi-arid climate. Out of thirty three sites only eight sites, viz. Saikur, Kumbhakheri, Nayapura, Borkheri, Kheriar, Nayagaon (Lhasi basin), Unchawad (Parvati basin) and Bamaniakheri (Parwan basin) have yielded Lower Palaeolithic tools. These tools are made of quartzite and the technology does not show any stage of maturity. These tools are much rolled and patinated in condition and some of them indicate long distance transportation. As these tools have been found in

the river bed itself and the existence of flakes, cores and debitage are very few, hence they cannot be categorized as factory sites. On the contrary it may be presumed that this area was temporarily visited by the prehistoric people who camped here when the rivers were in spate.

Coming to the Middle Palaeolithic period it has been observed that the people of this period occupied the same area where the Acheulian people once inhabited. For example, the sites like Saikur, Borkheri, Nayagaon and Kheriar on the Lhasi River basin have yielded Middle Palaeolithic tools. During this period tool-making technology was not well developed. Similarly, due to the severe aridity, the Middle Palaeolithic sites are comparatively sparse in Mewar plateau, viz. mainly in southern and south-eastern Rajasthan.

However, the significant increase of Upper Palaeolithic sites and associated tools made on chert, chalcedony, agate, quartz and jasper are noteworthy. The blade-burin industry along with a huge number of unfinished tools, flakes, fluted cores and debitage give the features of open air factory sites. The non-geometric microliths such as scrapers, burins, blades and arrowheads are profusely found, where geometric tools are very few in number.

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Excavations at Chandimau 2000-01

LOCATION: The village Chandimau (25° 3' N, 85° 30' E) is located about 12 km. east of Silao in Nalanda District of Bihar on the west bank of a seasonal stream *Panchanan*. Silao, famous for a special type of sweets called *Khaja*, is located in between Nalanda and Rajgir.

PREVIOUS WORKS: The site was discovered by Broadley (Patil 1963:79-80; Broadley 1979:51-52) as early as 1872, who described a beautiful tank in the western part of the village and ruins of a *stupa* towards south of a mound, where several Buddhist images, mostly mutilated, were kept towards east of the village, including architectural fragments, door jambs, lintels, etc., making a huge heap. But, when Cunningham came here, he noticed that "most of the finest images were already removed by Broadley". Cunningham further discovered a inscription of three lines on a sculpture referring to *Rajagriha* and King *Ramapaladeva* of *Pala* dynasty (Cunningham 1994:159). This sculpture is kept in Indian Museum. Further, R.D. Banerjee published the complete text of this inscription with its date *Samvat 42 Ashadhedine 30* of *Rampaladeva* region. The inscription starts with famous Buddhist creed and dedicated by a merchant *Sadhu Siharua*, son of a *Sadhu Bhadulva*, inhabitant of *Rajagriha* (Banerji 1990: 161). He also published the details of bas-reliefs depicted on the finely carved three stone pillars brought to the Indian museum in the year 1911. The depiction comprises of *Kirtimukhas* and scenes from *Mahabharata* (Banerji 1990:162-63).

The Excavation Branch- III, Patna of Archaeological

Survey of India, conducted extensive exploration around the village in 1999 and discovered four mounds of archaeological importance. First mound known as *Tilhapar* is situated south of a tank towards the southwest of the village. Local tradition ascribed that Lord Krishna and Bhima took a Holy Bath in this tank while on the way to Girivraja. Later, the king of Magadha, Jarasandh was killed by Bhima in wrestling. The size of this mound is 70 x 60 m. Second mound measures 30 x 20 m. with a height of 1 m., called as *Suryasthan* due to a solitary sculpture of *Surya*. This mound is situated in the southeastern side of the village. Some architectural fragments are also found scattered here. A trial digging revealed a brick floor (brick sizes 35x26 x6;34x25x6 cms), which indicates towards the existence of a temple of the Pala period. Towards the northeast of the village, on a small mound, a fragmentary sculpture of *Uma-Maheswer* is found lying. The fourth mound is known as *Garhpar* which is located in the eastern part of the village from where a sherd of Red Polished Ware was picked up during the exploration.

A large number of loose sculptures and architectural fragments have been unearthed from the nearby agricultural lands while ploughing which necessitated the thorough investigation of the area.

EXCAVATION: The mound, known as *Tilhapar*, situated in the south-western part of the village, was initially selected for excavation during 2000-01 under the Directorship of G.C. Chauley. The villagers from almost all the sides damaged this mound considerably by

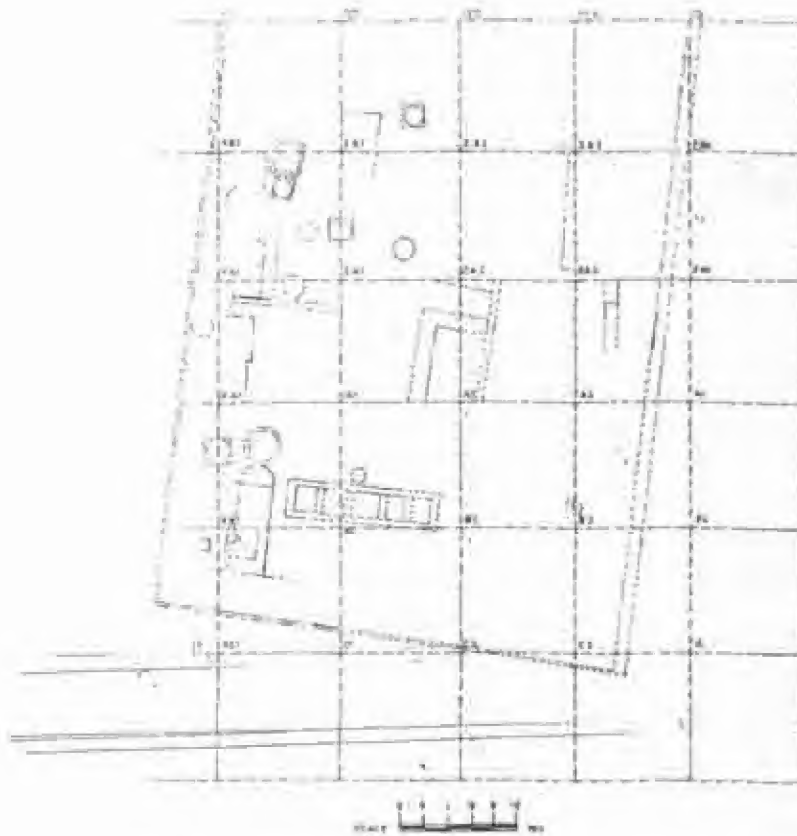


Fig. 1: Plan of excavated remains at Chandimau (2000-2001)
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converting it into agricultural fields. The entire mound was divided into grid pattern. There was scope for only 15 trenches, measuring 10x10 m each, for excavation.

Structures: The excavation revealed here the remains of a Buddhist temple consisting of a brick paved courtyard, over which votive stupas of various shapes and size were constructed. The entrance of this temple is from east, which is outwardly projected. The southern part of the outside projected portion of entrance is comparatively better preserved than the northern portion. The outwardly projected portion is about 5.60 m long. The width of this wall is 1.40 m and the entrance is 2.50 m wide opening. The other portion of the extremities of the temple is not traceable,

The courtyard of the temple is brick - paved and lime plastered. The remains of the lime plasters were traced in a very fragile condition. However, the brick pavement is comparatively in good condition, which was found in the trenches XC2, XC1, C1, and C2. These trenches are located in the extreme southern portion of the mound, where present-day agricultural land starts.

There are some other types of structures built over the brick - paved floor. In the southern side of the mound, the remains of 5 rooms, constructed in a single row, oriented in the east-west direction, were also exposed. The maximum exposed courses of these structures are five. The outer wall of these rooms is plastered with lime.

In the southwestern part of the mound, a very unique apsidal structure was exposed. The north-south axis is longer than the east-west axis. The northern portion of this structure is apsidal. The length of this structure is 8.25 m and five courses of bricks were exposed. Some other flimsy structures, badly damaged by the brick robbers, are also exposed but they do not yield any shape.

Votive *stupas*, totally twelve in number, were exposed which were constructed over the brick - paved courtyard of the temple. These Votive stupas are of different shapes and sizes. These stupas are numbered from 1 to 12 in clockwise, starting from southern portion onwards.

Pottery: On the basis of ceramic industry, it can be said that Chandimau is a single cultural site. The site yields a large number of sherds of red ware. Most of the sherds are well fired and almost devoid of any surface treatment but very few of them are treated with red slip. Before the slip treatment, the riverbank dust was used over the body of the pot to achieve shining. This process must have been done on the leather-hard stage conditions. The fabric ranges from coarse to medium. The types include vases with narrow mouth, vases with wide mouth, carinated *handis*, bowls, lamps, lids and basins. A big size basin with naga figures all around the rim needs special mention, which seems to be a ritualistic object.

Antiquities: The excavation yielded a total number of 59 antiquities including 42 stone objects, 16 terracotta objects and a single fragment of a glass bangle. The terracotta objects include 11 sealings, 2 fragments of plaques and a single bead, hopscotch and a miniature *stupa*. Eleven terracotta sealings have been found in the excavation so far. Some of them are defaced and blurred. These sealings are of oval, circular and rectangular in shape. Some of them were depicted with Buddha in *bhumisparsha* pose and inscribe with Buddhist creed. A fragment of sealing (10.5x4.7 cm.), having the depiction of two armed *Avalokiteshvara* in upper portion and a four armed sitting goddess in lower portion, with blurred inscription, was also found. Two fragments of terracotta

plaques (12.5x8.8 cm; 8.8x7 cm) depicted with *Bodhisattva* in standing pose in the center and other Buddhist deities in sitting pose in the *parikar* has been found. A terracotta miniature *stupa* having an almost square base (6x5.8 cm) and 1.8 cms height is also noteworthy. Thirty-two fragments of stone sculpture have been recovered during the excavation. Among these fragments of sculptures, a pedestal (62x13.5x7.5 cm) depicted with *saptaratna*, four armed *Vishnu* (24x22x9 cm), a fragment of panel depicting rows of *Vishnu* (20x27x8 cm), *Tara* (20x19x10 cm), *Buddha* in *bhumisparsha mudra*, Buddhist goddess *Marichi* (16.5x16.5x5 cm) are noteworthy. On the basis of materials recovered from the excavation, the site can be dated to the *Pala* period. No evidence of preceeding or succeeding period was traced in course of the excavation.

As described in the beginning, the presence of a good number of sculptures in and around this village always fascinated the archaeologists. The villagers also took special interest in this sculptural heritage and they constructed a village museum to house the sculptures scattered at different places over the area. In 1999 there were 62 numbers of sculptures or sculptural fragments stored in this village Museum, which include *Buddha*, *Avalokitesvara*, *Ganesha*, *Suryanarayana* (Tiwari 2004: 257-259), *Durga*, *Surya*, *Uma Maheshvara*, *Sivalinga*, *Harihara*, *Chamunda*, *Vishnu*, etc. Some of them have already been shifted to other museums. Apart from sculptures the architectural members depicting the scenes from epics are also found. Though the excavated materials belong to the *Pala* period, yet it seems that the carvings of sculptures were started here much earlier. The depiction of *Kirtarjuniyam* (Nagrujarao 1979: 95) along a doorjamb is the earliest representation of its kind, which became a very popular during the Early Medieval period.

As far as the identification of this site is concerned, perhaps there is hardly any reference of Chandimau in the contemporary literature but, while exploring the nearby area, very important evidence came across. Just about one km south of Chandimau, there is a village named *Pavadih* and there are references in early Buddhist literature that



Chandimau : General view of Tilhapat



Chandimau: Votive stupa on brick platform (Pala period)



Chandimau : Terracotta sealings (Pala period)



Chandimau : Terracotta plaques (Pala period)

Fig. 2



Chandimau : Terracotta miniature snupa (Pala period)



Chandimau : Tara (Pala period)



Chandimau : Visnu (Pala period)



Chandimau : Bodha in bhūmisparśha pose (Pala period)



Chandimau : Pedestal depicting astaratna (Pala period)



Chandimau : Panel depicting rows of Visnu (Pala period)

Lord Buddha used to make a halt at *Pavarikamravana* while proceeding towards Pataliputra or Vaishali from Girivraja. As per *Mahaparinirvana sutta*, during the last journey from Girivraja to Kushinara, Lord Buddha not only stayed at *Pavarikamravana* but also preached the people of the village (Upadhyay 1991:188). Presently there are mango groves around the village Pavadih and as per villagers, these mango groves are very old tradition of their village and they are still maintaining it. So there is a strong possibility that Pavadih is a corrupt form of *Pavarika*. During the Buddha's time, possibly Pavadih was a mango-grove garden and the village Chandimau was the residential area. This matter is still a subject of further investigation but it is not out of place to mention that there is an inscription referring to a donation made by a resident of Pavarika named *Dadatus* engraved on the railing of the great stupa of Sanchi (Cunningham 1997: 249). The inscriptional evidence further attests the Buddhist contact of Pavadih.

The archaeological importance of the site has undoubtedly been established during the exploration. The excavation at *Tilhapar* mound of Chandimau has revealed

the remains of votive-stupas of the Buddhist temple as well as brick - paved courtyard. The whole temple complex may be dated to Pala period. Trial digging at *Suryasthan* mound indicates the existence of a Hindu temple of the same period. The result of this excavation with the literary data suggest that Chandimau was a flourishing religious and art centre from c. 9th to 11th century AD, where Buddhist and Hindus coexisted peacefully. The presence of Red Polished Ware sherds and post-Gupta stone sculptures may further push back the antiquity of the site.

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Subsistence Pattern in Mesolithic Communities of India

The Mesolithic culture represents an age which was transitional between hunting economies of earlier periods and food producing economies of the succeeding pastoralists and agriculturists. The subsistence economy of the Mesolithic people had been based on hunting and gathering. They moved from one place to another in search of game and vegetal food materials such as fruits, roots and tubers, and wild grains. The faunal remains recovered from the excavated Mesolithic sites yield the evidence for chopping, roasting and extraction of bone marrow. These pieces of evidence provide useful insight into the dietary habits of the Mesolithic people. Their tool-kit and hunting technology also provide adequate information regarding their subsistence economy. Nevertheless, it appears that during the Mesolithic times hunting activity was increasingly supplemented by vegetal food collection; as hunting is a high-risk, low-return subsistence activity, whereas gathering is a low-risk, high-return one. Another development towards the last phase of the Mesolithic period was the domestication of some selected species. Thus a stage was almost set for man to enter into a settled and productive economy during the mature phase of the Mesolithic period.

Langhnaj, which is contemporary to the Mature Harappan phase, has yielded remains of wild animals such as rhinoceros, pig, *cheetal*, hog deer, *barasingha*, *neelgai*, black-buck, mongoose and wolf, of which the last two were not used for food (Clutton-Brock 1965). Some undetermined species of bovines were also reported from the site. The site yields two heaps of limb bones of animals.

Extraction of bone marrow is attested by fractured bones as well as the evidence of a neat hole bored into the proximal end of the tibia. The absence of cranial bones here and at other places of the habitation suggest that the people butchered their game at the place where it was slain, carrying the choice portion of animals to the area of occupation (Corvinus & Kennedy 1963). No hearth or any other evidence of fire has been reported from Langhnaj but a bone was found clearly charred by fire, most probably which was man-made fire (Cornwall 1965).

At Bagor, 72% of the total faunal recovery comes from the Mesolithic phase, and the identified animals include sheep, goat, buffalo, humped cattle, pig, black-buck, *chinkara*, *cheetal*, *sambhar*, hare, fox, and mongoose. Some aquatic fauna like tortoise and fish have also been identified. Most of the bones are charred and fragmentary which indicate that meat was roasted on open fire and the bones were broken and split open for the extraction of marrow. Faunal remains are abundant in the Mesolithic phase, whereas from the Chalcolithic period onwards their quantity begins to diminish. It can be inferred that animal food was more important in the earlier stages of Mesolithic culture. The remarkable correspondence in the distribution of animal bones and microlithic industry confirms that hunting was an important activity during the Mesolithic phase (Misra 1973).

The animal species identified at Adamgarh include monitor lizard, crested porcupine, horse, donkey, *barasingha*, *sambhar*, *cheetal*, Indian hare, dog, one-

humped cattle, buffalo, goat, sheep, etc. Some of the bones of the animals such as humped cattle (*Bos indicus*), pig (*Sus scrofa cristatus*), cheetal (*Axis axis*), etc., are charred suggesting that they have been roasted in an open fire. The bones of some animals bear definite cut-marks indicating their probable use as food. At Bhimbetka, remains of species like *Bos indicus*, *Axis porcinus*, *Cervus unicolor*, *Rhinoceros unicornis*, etc. have been identified. However, the Mesolithic painted rock-shelters of Central India and Vindhyan region depict a large variety of animal species being chased and hunted. The paintings provide ample evidence regarding the hunting activity and the variety of prey.

The fauna of the Ganga Valley sites have revealed the presence of large mammals such as *Bos species* (perhaps wild cattle), gaur, wild buffalo, elephant and rhinoceros. Hippopotamus has also been identified at Sarai Nahar Rai (Alur 1980). In general, the bones of these animals do not indicate that such large animals were actually hunted for food. It has been suggested that probably carcasses or isolated bones of these animals were collected and were utilized for making bone tools. At Damdama, more than thirty species of animals have been identified comprising mammals, fish, birds, reptiles and molluscs with the mammals constituting the majority; a total of six species are mammals. Thus, it is clear that Mesolithic people at Damdama were mainly dependent upon venison (Thomas *et al.* 1995: 30-36). In addition to these, species such as black-buck, gazelle, *neelgai*, wild pig, etc. were also exploited at Damdama and other sites of Ganga Valley. The range of wild mammals suggest a wide spectrum indicative of hunting and gathering groups exploiting all possible natural resources (Thomas & Joglekar 1994).

Alur (1980:201-27) has studied the faunal remains from Sarai Nahar Rai and Mahadaha along with other sites and found the proof for the fact that dwellers practised hunting of wild cattle for their food requirements and recovered edible flesh from their body. The identification of roasting, chopping and extraction of marrow from these provide an indication of their use for purpose of food. Alur also identified chopping marks along with the roasting. It

has been inferred that chopping operation was entirely food-oriented to pullout or chop-off the flesh attached to bones even after heavy roasting. At Sarai Nahar Rai, Alur identified animals which include bison, hippopotamus, sheep or goat, deer, stag, elephant and tortoise while at Mahadaha these include cattle, sheep, goat, antelope, deer, bison, hippopotamus, swine, horse, carnivores, rat, tortoise, fish and birds. It is important to mention here that Alur's identification suffers from discrepancies and is disputed.

If the faunal studies provide evidence of hunting and use of animals as food resources, there are evidences of food collection from vegetal products. As mentioned before food gathering is a low risk-high return activity, the Mesolithic man collected a variety of wild cereals, fruits, roots, honey, etc. The most direct evidence regarding the collection of vegetal material comes from Chopani Mando phase III. Here the remains of charred or carbonised rice were found embedded in the lumps of burnt clay. The remains of rice from advanced Mesolithic level represent wild variety. Some plant remains have also been found here. If the discovery of wild rice/rice husk is looked in the context of grinding stones and querns and mullers, it can be suggested that collection of wild grains was a prevalent activity during this stage. Querns, mullers and muller-cum-anvil in a large number have also been found at many other sites in the Mewar region, Vindhyas and the Ganga Valley, right from the early Mesolithic phase onwards. It is noteworthy that querns from the Mesolithic sites are extremely shallow when compared with those from the Neolithic ones. This indicates that the Mesolithic querns were used for grinding of nuts and wild edible grains while Neolithic ones were manufactured with a view to pounding rice or other food materials. The evidence of rotary motion is very clear in case of some of these querns. Pollen analysis of the Vindhyan and Ganga Valley areas have shown a preponderance of *graminae* which might have included wild edible grasses and cereals, some of which lend themselves to domestication later.

The evidence of both hunting and food gathering comes into light from thousands of paintings in caves and rock shelters of the Vindhyas and Kaimur hills. The hunting

scenes at Bhimbetka and other caves and rock shelters show the hunt of a variety of game with spears, bow and arrows, all tipped and barbed with microliths; hunters chasing (in one scene there are eighty individuals in the expedition) and cornering the game; shooting arrows at the prey; transporting the kill (to the home base); butchering; fishing by using net traps (26 varieties of fish have been recorded in paintings); and trapping of small game, birds, rats, turtles, etc. Women are shown participating in cornering the game. Other food gathering activities shown in the paintings are fruit collection, women carrying baskets of fruits; honey collection; and using rubbers and querns (Misra 1989).

Valuable information regarding the mode of subsistence and dietary patterns can be had by careful analysis of human dentition independently. Human skeletons of a few sites including Langhnaj (Ehrhardt & Kennedy 1965), Bagor (Lukacs 1982) Sarai Nahar Rai (Lukacs & Pal 1992) have been subjected to analysis of dentition. At Langhnaj, strong abrasion of the teeth has been connected with a coarse diet. At Bagor, interproximal attrition of cheek teeth and crowding of the anterior dentition have been associated with coarse and tough diet.

The study of Mahadaha and Sarai Nahar Rai dentition has provided the following conclusions regarding subsistence and diet –

- (a) Wear on the occlusal or biting surfaces of teeth is heavy, suggesting a combination of hunting and gathering subsistence with a coarse and abrasive diet.
- (b) The types and prevalences of dental disease strongly suggest a subsistence pattern that depended heavily on hunting and gathering. The low dental caries prevalence implies that diet was low in carbohydrates, refined sugars and soft sticky foods.

The ethnographic records of the tribal people living in the areas which were also occupied by the Mesolithic people can provide some sort of attestation of the subsistence pattern. If the habits of Yerukulas, Yanadis,

Chenchus and others are any guide, there is likelihood that the vegetable food foraged during the Stone Age times might have comprised the following:

- (1) tubers and yams like *Dioscorea oppositifolia* wild, *D. bulbifera* Linn., *D. pentaphylla* Linn., *Stemona tuberosa* Rox., etc.;
- (2) flowers of *Bassia latifolia* Roxb.;
- (3) flowers, fruits and seeds of *Buchanania latifolia* Roxb.;
- (4) fruits and seeds of *Artocarpus integrifolia* Linn.;
- (5) fruits of *Ficus glomerata* Roxb., *Capparis septaria* Linn., *Grewia asiatica* Linn., *Opuntia dillenii* Haw., *Eugenia alterifolia* Wight, *Zizyphus oenoplia* Mill, *Terminalia belerica* Roxb., *Memecylon edule* Roxb., etc.
- (6) Leaves of *Erythroxylon monogynum* Roxb., *Canthium parvi florum* Lam., *Celosia argente* Linn., *Digera muricata* Linn. etc., and succulent parts of plants like *Ceralluma* wh., *Vitis quadrangularis* Linn.; *Caryota vrens* Linn., etc., particularly in the east coast and Andhra Pradesh.

Similarly, on the basis of faunal evidence obtained from the caves and the hunting habits of the present tribes, the fauna exploited during Stone Age can be said to include a large number of animate, at least fifty types of birds and not less than seventy types of aquatic fauna (Murthy 1980).

In other areas there are tribal groups such as Van Vaghri (Thar Desert), Birhor (Chota Nagpur), Kadars (Kerala), Baiga or Bhumia, Gond, Bujh, Muria, Muria, Bison-horn Maria Gond (Madhya Pradesh/Chhattisgarh), Kandh, Savara, Gadaba, Juang (Orissa) and Warli & Koli (Maharashtra) whose economies are geared to hunting and gathering, riverine fishing, marine fishing and shifting cultivation. These groups, even if they are considerably integrated into the village economies, pursue their traditional modes of food procurement. They hunt small

game and birds, collect insects, honey and wild plant foods. For hunting game and birds they use nets, spring traps, snares, pitfalls and different kinds of bow and arrow. It can be argued that in the comparable habitats such food procurement devices must have been in use during terminal Pleistocene times and later, possibly on a much larger scale (Misra 1989).

Beginning of Domestication

The Neolithic age which succeeds Mesolithic, wherever found in stratified context is characterized by domestication of plants and animals, the advent of agriculture and pastoralism, many a time both going side by side. However, evidence from Mesolithic sites such as Bagor and Adamgarh suggest that at least a few species of animals had been domesticated during the advanced phases of Mesolithic itself, though the evidence of domestication of plants is absent in this phase. At Bagor, initial studies by D.R. Shah of Baroda University led to conclude that that fauna was entirely wild. But later, K.R. Alur of Dharwar, on the basis of study of material of enlarged excavation reported that bones of domesticated species of sheep/goat and cattle of both domesticated and wild varieties were in abundance (Misra 1973). Thus, it has been established beyond doubt that the economy of Bagor was based on stock rearing along with hunting and gathering as at this site the faunal material was systematically collected and the radiocarbon dates are also reliable (Misra 1974).

Among Adamgarh fauna, Bhola Nath has identified six domesticated species, viz. dog, Zebu or one-humped cattle, buffalo, goat, sheep, and pig. It has been said that

here, about 50% of the animal bones are of the domesticated variety. However, as the evidence is scanty, the radiocarbon dates are insecure, and the stratigraphy is unclear; it has been argued that the faunal material identified by Nath could be of a much later date than the Mesolithic period (Misra 1994). Thus, the presence of domestic animal may at the most suggest some sort of Neolithic tradition hitherto unrecognised (Joshi 1978:84). Similarly at the Ganga Valley sites of Sarai Nahar Rai and Mahadaha, Alur (1980) had identified bones of domestic animals which included sheep, goat, cattle, etc. However, the fauna when re-analysed reveals not a single bone of any domestic animal among the thousands of bone fragments. Alur's identification of domestic species does not seem convincing. A single bone of a goat and one of domestic cattle found at Dandama were argued to be later intrusions. At Dandama not only is there no evidence of domestic animals but the probable domesticates are absent as well (Thomas *et al.* 1995; Thomas and Joglekar 1994).

As far as domestication of plants is concerned, clear evidence of cultivation of rice has been found from Neolithic sites of Mahagarha and Koldihwa in Ganga Valley. At Chopani Mando, from the advanced Mesolithic phase which is also designated as Proto-Neolithic, seeds of wild variety of rice have been found embedded in lumps of burnt clay. From this phase stone objects such as mullers, querns, ring stones, rubbers, etc., have been found. The people at this stage invented pottery and also made pits for storage purpose. The people towards the last phase of Chopani Mando began harvesting and processing of wild grains which had set the stage for a settled agriculture with the advent of Neolithic technology.

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Copper Artifacts from Bagasra (Gola Dhoru), a Harappan Site of Gujarat, Western India

The mastery over metal working enabled man to make considerable changes in all walks of life and led him to the threshold of urbanization. The development of metallurgy, extraction and fabrication made it possible for man to use it for producing variety of art and craft items. The antiquity of the metals in the world context goes back to seventh millennium BC, as evidenced from western and central Anatolia, across the flanks of the Taurus and Zagros mountains to the edge of the central desert of Iran (Wertime 1964). In the Subcontinent, the earliest evidence of metals appears in the aceramic Neolithic levels of Mehrgarh and Mundigak (Jarrige 1982; Allchin & Allchin 1982). Though there was a slow increase in the quantity of metal artifacts during pre-Harappan time, the succeeding Harappan culture witnessed a plethora of metal objects especially copper. The copper findings discovered in various forms range from utilitarian objects to intricate pieces of art and ornamentation.

An unknown civilization in Indus valley region, contemporary to Mesopotamian and Egyptian came to light through the excavations in 1920s at Mohenjodaro and Harappa highlighting the civilized life in the Indian subcontinent dating back to 2500 BC. The Harappans established themselves over the regions of what are now in Pakistan and north western India covering an area of 680,000 square kilometers, an area twice the size of the Egypt or Mesopotamia (Kenoyer 1998). Their artisans produced an impressive array of artifacts from wide varieties of raw materials such as stone, metal, clay and shell. Though the Harappans continued to use chert blades,

they had varieties of copper tools such as celts, knives, spearheads, arrowheads, chisels, razors, saws, drills, knives etc. in addition to vessels and figurines. The present paper is an attempt to understand the variety of copper objects unearthed from Bagasra, a Mature Harappan site of Gujarat.

The Site

Bagasra (23°03'30" N; 70°37'10" E), the Harappan site, locally known as 'Gola Dhoru' is situated about half a kilometer southeast of the Bagasra village on the southern shore of the Gulf of Kachchh in Maliya Taluka of Rajkot District, Gujarat. This site was excavated by the Department of Archaeology and Ancient History, M.S. University of Baroda from 1996 to 2005. The material remains unearthed in each field season at this site proved several interesting aspects of a fortified settlement of the Harappan Culture. The site measuring 160 x 120 m is roughly rectangular in layout and unveiled 7.75 m thick deposit of habitation belonging to four distinct developmental phases, viz. Phase I to Phase IV based on stratigraphic context, quantitative distribution of distinct and diagnostic artifacts and also by considering architectural/structural features.

Phase I represents the early stage of the Mature/Urban phase of Harappan along with Anarta pottery of north Gujarat. Phase II demarcates the construction of a fortification and incorporates both Classical/Mature Harappan remains and Anarta Pottery. In addition to these, isolated sherds of the Sorath Harappan pottery are also

found in the upper layers of this phase. Phase III is remarkable for the predominance of Sorath Harappan pottery over the Classical Harappan and a general disorganization of construction activities at the site. Phase IV is the Post-Mature/Urban Harappan habitation and is distinguished by a Sorath Harappan pottery; resembling Rangpur IIC and Rojdi C pottery; and by the absence of the Classical/Sindhi Harappan artifacts in the deposit (Sonawane *et al.* 2003).

Though the size of this settlement is comparatively small, it has yielded a large number (about 250) and varieties of copper artifacts such as chisels, bangles, knives, axes, points, spear-heads, scissors, rings, hooks, rods, beads, ingots and remarkable objects like bone-handled knives, *parasu* and vessel. Apart from the aforesaid objects, there are materials which indicate copper working such as crucible pieces = and slag. Among the four phases of occupation of this site, as far as concentration of copper objects is concerned, Phase I yielded the lowest number while Phase II & III are rich both in number and variety while Phase III has the maximum yield (Chart 1). There is a drastic reduction in quantum during Phase IV as compared to earlier Phases. To have an accurate understanding of the variety of copper objects from the site, their presence at various occupational phases has been studied.



Chart 1: Copper Objects from Phase I to IV & Surface

Phase I

Copper objects were numerous even in the earliest urban occupation level, i.e., in Phase I of the site and is represented by 1.00 m to 1.75 m habitation deposit. The structures of this phase were built of dark grey mud-bricks of Harappan standard size (1:2:4). The noteworthy copper objects from this phase are, narrow-shaped spatula (Pl. 1), copper rods, bangle fragments, ring and few unidentified objects (small broken pieces measuring 2 x 3 mm thickness) (Chart 2). The trenches yielded copper objects falling to this phase were, Do5, Ea6, Eg2, Eo10 Eo3 and Er13. In association with fine copper implements, classical Harappan and regional (Anarta ware) pottery, shell bangles, terracotta cart frames, wheels and triangular cakes, stone weights and beads of carnelian and lapis lazuli were recovered from this phase.

Phase II (Urban)

This is the most prosperous occupational phase of this site. This phase is incorporated with evidences of onset of urban life at the site such as construction of massive fortification wall and flourishing craft activities, such as shell working, stone bead making and faience making. The stratigraphic evidences indicate that the fortification wall, measuring 5.20 m width was built in three successive stages. The urban character of this phase is further emphasized by the discovery of inscribed steatite seals and a few terracotta sealings, beads of carnelian, amazonite, lapis lazuli, steatite and faience, shell bangles with chevron decoration, long Rohri-chert blades, terracotta toy cart frames and triangular cakes and number of copper objects. The copper artifact assemblage of this phase (Chart 3) comprises spear-heads, rings, rods, hooks, knives, nails, pellets, broken bangles, wires, spiral rings, point, pin, bead, thick chisel, arrow-head and many unidentified objects (majority of them are small bits/pieces of negligible size and weight). This cultural phase yielded fifteen varieties of objects of various functional uses. One of the unique copper

artifacts, namely bone-handled knife (BSR 7012) is related to this phase (Fig. 1).

Phase III (Late Urban)

This phase indicates terminal stages of Harappan occupation and prevalence of the Sorath Harappan artifacts (Sonawane *et al.* 2003). There is little evidence of new structural construction during this phase. The associated finds from this phase are beads of carnelian, lapis lazuli, steatite, faience, shell bangles, terracotta cart-frames triangular cakes and sealings, long Rohri-chert blades, stone weights and copper objects. This phase yielded maximum number of copper artifacts (Chart 1). The copper artifact array of this phase comprises bangles, hook/ fish hooks, knives, points, rings, spiral rings, wires, chisels, rods, chain, celt, bead and blade (Chart 4). The noteworthy finds such as copper hoard, vessel (BSR 2078) (Pl. 3) contained bangles (BSR 2078.1 to 2078.8), celt (BSR 2078.9) and *parasu* (razor) (BSR, 6300) (Pl. 4) are associated with this phase.

Phase IV (Post-Urban)

The post-urban habitation deposit which is directly overlying the earlier phase is characterized by Sorath Harappan ceramic assemblage and found confined to the southern part of the mound. Absence of remains of this phase in trenches within the fortified area indicates that it post-dates the habitation within the walled city. The Phase IV deposit was almost devoid of beads of semiprecious stones, bangles and other items of shell, very few numbers of copper artifacts. This situation probably indicates an impoverished economy of the society as compared to the preceding phases. The few copper objects of this phase are hook, knives, nail, point and a thick chisel (Chart 5). Copper knife (BSR1502) was made out of thin rectangular sheet of copper (Pl. 7). Similar kinds of knives have been reported from Post-Harappan context at Kuntasi

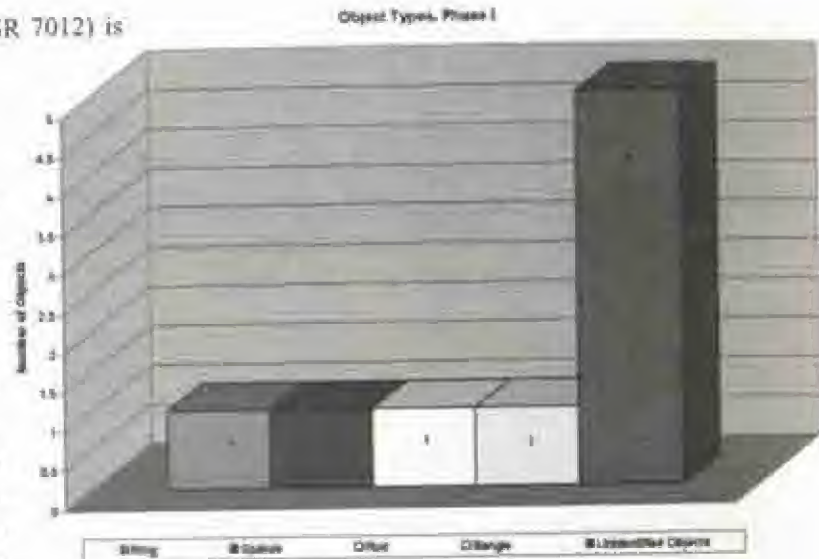


Chart 2: Various Types of Copper Objects, Phase I

(Dhavalikar *et al.* 1996) and at Rojdi (Possehl and Raval 1989).

Remarkable Copper Artifacts from Bagasra

Copper Hoard: The most interesting among the copper artifact assemblage of Bagasra is the Copper Hoard. This hoard of copper objects (consisting eight bangles and a celt) was found in a medium-sized copper vessel (Fig. 1), which is a pot with wide open mouth, sharp carinated body and a drooping base. This was obtained from the trench E115 by the side of the southern periphery wall. The vessel was measuring 10.5 cm in height and 775 gm in weight. Mackay (1938: Pl. CXVI) has illustrated similar copper vessel from Mohanjodaro. The Harappans were the only people in India who used metal lavishly for vessels (Agrawal 1982). This vessel seems to have made in two parts, the bottom and the top and then joined together. It is an excellent example of Harappan copper fabrication techniques such as sinking, raising and running on. The celt (Fig. 1) weighs 250 gm and is measuring 110.06 mm length, 91.91 mm breadth and 8.41 mm thickness. Vats (1940: Pl. CXV) has illustrated similar kinds of axes with concave cutting edge from Harappa. The bangles are of

varying thickness and diameter (Fig. 1). Their thickness varies from 8.86 mm to 6.54 mm and the diameter from 82.44 mm to 67.21 mm. Khurdi hoard (Agrawala 1980) bangles appears quite similar in appearance to one of the bangle BSR 2078.3 from this hoard. The other bangles draw some parallels with those illustrated by Yule (1985) as the representative finds from northern Rajasthan, southern Haryana and Kayatha. Stratigraphically, the copper hoard is associated with cultural phase IV, i.e., towards the end of urban phase of Harappan culture. The phase IV indicates evidences of decline in urban standards. Therefore, the hoard seems to be an attempt to conserve resources (Sonawane *et al.* 2003) or perhaps stored for recycling (Bhan *et al.* 2004).

Knives with Bone Handles

Two knives (BSR 6686 & BSR 7012) which have bone handle attached to their blades have yielded from the site (Fig. 1). Apart from the above-mentioned ones, a third broken knife was also unearthed from the site (Antiquity No. BSR 7007), which carries impressions (on one of its

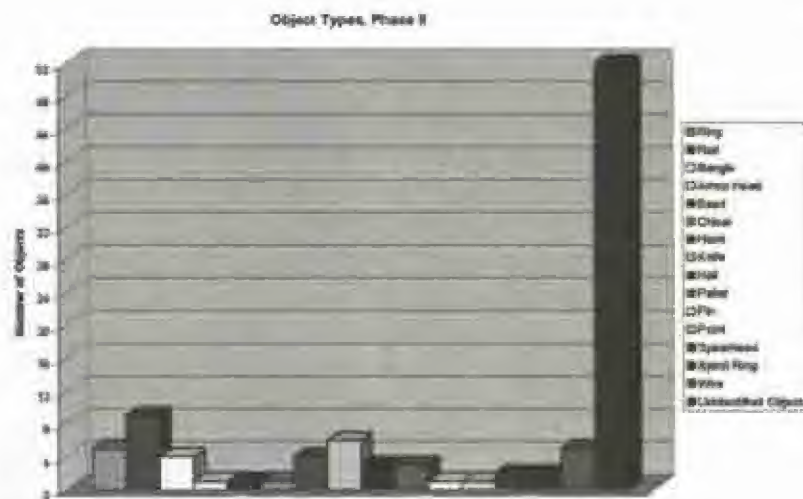


Chart 3: Various Types of Copper Objects, Phase II

side edge) of a probable bone handle/cover on it. These well preserved bone-handled knives are unique in their kind. BSR 6686, the biggest and broadest knife among the three is complete and weighs 85.81 gm. It is of 200 mm length (including the extended handle) and the knife blade portion alone is of 171.13 mm length, 52.27 mm breadth (maximum) and 3.74 mm thickness. BSR 7012 is complete though smaller in size compared to earlier one, weighs 32.93 gm. The total length of the object is 150.20 mm and 4.05 mm thickness (maximum). The maximum breadth of the blade portion is 23.03 mm and minimum is 19.01 mm. The cutting edge is thin and measures 0.83 mm thickness. BSR 7007, the third knife with residue of bone handle impression is small and broken, weighing 13.776 gm (Fig. 1). Its dimensions are 79.01 mm length, 20.74 mm breadth and 4.50 mm thickness. The associated occurrence of these bone handled knives with large quantities of fish and animal bones indicate some kind of functional relation with preparation of fish or butchering (Bhan *et al.* 2004), which is yet to be established.

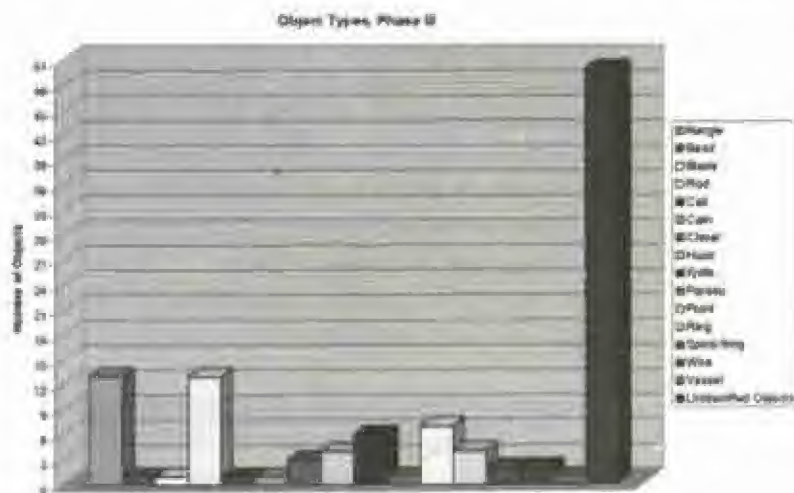


Chart 4: Various Types of Copper Objects, Phase III

Spear Heads

Bagasra yielded two spear heads (BSR 2890 & BSR 6885); both were stratigraphically associated with cultural phase II. The first spear-head (BSR 2890) (Fig. 2), weighs 76.05 gm and is of 179.65 mm length and 4.92 mm thickness. The breadth of the tip portion is measuring 17.86 mm that of the middle portion is of 31.10 mm, the broadest part of the spear measures 54.28 mm and the hafting end's breadth is 11.55 mm. The second spear head (BSR 6885) is big and extensively corroded leaving no core (Fig. 2). It weighs 65.13 gm, and is of 131.34 mm length. The maximum breadth of the same is 59.74 mm and is of 4.38 mm thickness. Similar spear-heads were illustrated by Vats (1940: Pl. CXII) from Harappa.

Parasu /Razor

A small Parasu/Razor (BSR 6300) is yet another interesting object (Fig. 1) in the array of copper artifacts from Bagasra representing Phase III. This object has incurved lateral wings on either side and hence look like parasu. It measures 108.62 mm length and 2.13 mm thickness. The blade portion is of 57.16 mm breadth. The handle is tapering from the blade portion towards the holding end. The handle breadth varies from a maximum of 12.43 mm to a minimum of 5.82 mm. The length of the handle portion is 71.38 mm. It is of 14.645 gm weight. The literary sources especially Vedic literature refers to wide spread use of copper articles (knives, razors and needles) for large public sacrifices and rituals (Chakrabarti 1996). The size and form (shape) of the object makes one to relate it with ritualistic functions or perhaps used as a razor. Similar kinds of razor were reported from Kalibangan (Lal 1979) but associated with pre-Harappan levels.

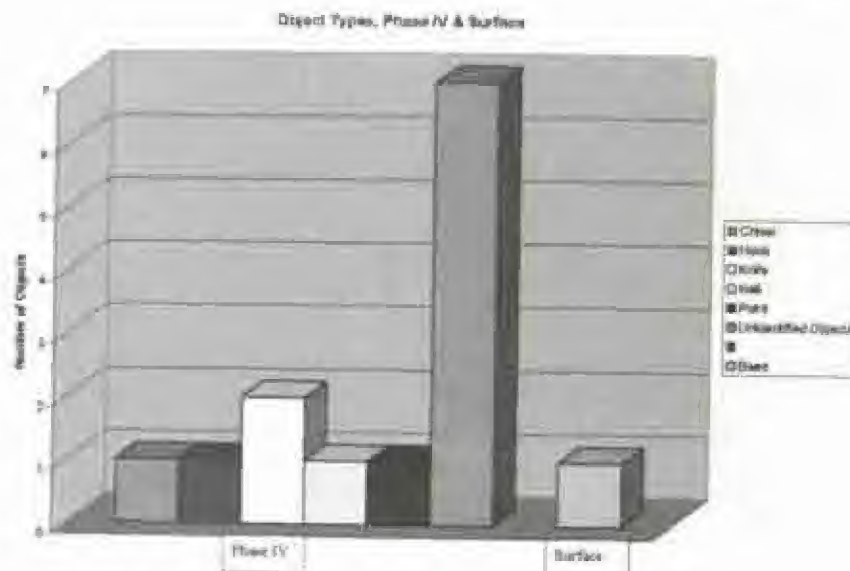


Chart 5: Various Types of Copper Objects, Phase IV & Surface

Chisels

All the three Phases yielded chisels except for Phase I. Phase II yielded a complete chisel (BSR 2888) weighing 83.47 gm (Fig. 2) from trench Eb11 associated with the fortification wall. It is in well-preserved condition with good core. It is thick (12.06 mm) at one end and gets tapered towards the cutting edge with a thickness of 6.66 mm. This chisel is of 61.05 mm length and 20.03 mm breadth. Phase III represented two chisels. Among them, BSR 3032 from trench Eg15 is very small and thin. It is corroded and weighs 4.29 gm. It measures 44.98 mm length, 5.90 mm breadth at the narrow end, 6.70 mm at the broader end and 3.18 mm thickness. The Phase IV's yield is a heavy and long chisel (Fig. 2) with semi-circular cross section. It is a well-reserved object with good core. It weighs 125 gm and measure 108.59 mm length, 21.72 mm breadth and 14.31 mm thickness.

Celts

Bagasra yielded two celts (Fig. 3) both representing Phase III. Among them, the first one (BSR 2078.9) was found in the vessel in hoard and the second (BSR 6324) was from trench Eo11. The first one is explained earlier

along with the hoard. The second chisel is thin compared to the earlier one. It weighs 76.10 gm and is of 108.84 mm length with its wider end measuring 63.43 mm breadth and narrow end 51.10 mm. Its thickness varies from 5.17 mm (working edge) to 6.54 mm.

Points

Phase I was devoid of any points. Phase II and III yielded one and seven points respectively. The Phase IV also yielded one point. BSR 3958 is a very long point with its length 100.31 mm and weighs 6.42 gm. The maximum thickness of it is 4.12 mm and the pointed tip is of 2.49 mm.

Hooks & Fish Hooks

Both Phase II & III revealed four hooks and Phase IV one. Among them BSR 7035 from trench Eo6 has a peculiar look, shape (Fig. 3) and showed fabric-like impressions on its broad flattened end. The other end is curved as a hook and is of 8.96 mm breadth. The broader end is of 18.06 mm breadth. Another hook (BSR 4684) from Eo10 weighs 15.31 gm and has 9.03 mm thickness.

Rings and Spiral Rings

Phase I yielded one ring, while Phase II has five rings and two spiral rings, Phase III yielded four rings and two spiral rings, while Phase IV did not represent any ring. Among them BSR 4769, the spiral ring from trench Fk9 has double fold coil. The breadth of the double coiled portion is 14 mm and thickness is 4.5 mm.

Arrowhead and Scissor Blades

Phase II represents an arrowhead (BSR 8636) from trench E113 and two scissor blades (BSR 6794.1 & 6749.2).

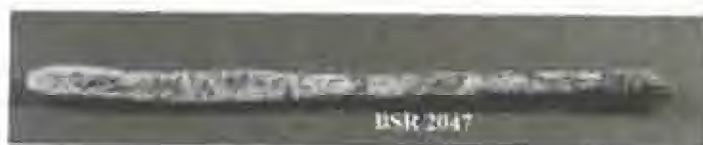
Copper Working at Bagasra: Concluding Remarks

Bagasra, the small coastal Harappan settlement

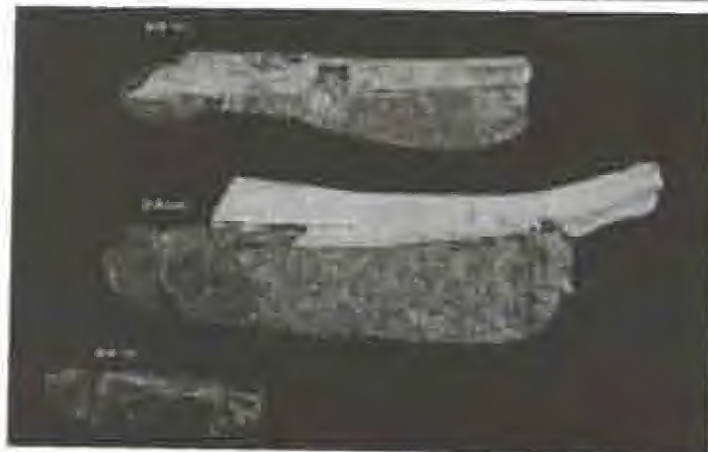
evidenced copper working from the very beginning phase of occupation at the site. Though the numbers of objects falling to this cultural phase were less, the beginning of copper working was already initiated here. The succeeding Phase II, which is the most prosperous period in the Urban Phase habitation of the site yielded rare objects such as bone-handled knives and also indicated an increase in number and variety of copper artifacts. The Phase III has the highest number of copper objects yield and has remarkable items such as bone handled knives, copper hoard, and *parasu* associated with it. The Phase IV with its reduced number of copper artifacts indicates economic recession. However, no direct evidence of copper smelting has been found from the site. Recovery of a few heavily sand-tampered clay crucibles (Fig. 3), ingots (Fig. 3) and slag remains highlight the copper working at the site. The small brick structure of Phase I, adjacent to the western fortification wall in trench Eb11 appears to be associated with copper working. The remains of intense use of fire along with copper objects and crucible (small pottery vessel) probably utilized for melting copper ingots. A study of the trench-wise spread of the copper objects in the site and its relation with different craft activities can produce an advanced understanding about copper working at this site. Further scientific studies such as metallographic and chemical analysis of the objects, and detailed study of crucibles and ingots can give us more insight about smelting and smithery techniques prevailed at Bagasra.

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Spatula, Phase I



Bone handled knives, Phase II & III



Cooper board (vessel, celt & bangles), Phase III



Paxa, Phase III

Fig. 1: Artefacts of various phases



Spear head, Phase II



Spear head, Phase II



Knife, Phase IV



Chisel, Phase II



Chisel, Phase IV

Fig. 2: Copper artefacts of various phases

Celts, Phase III



Hooks, Phase II & III



Ingots, Phase II



Broken crucible, Phase II

Fig. 3: Copper artefacts of various phases

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Discovery of a Unique Wooden Seal from Khaparkhera, District Dhar, Madhya Pradesh

The multicultural site of Khaparkhera (22°04'2.163 N; 74°51'2.283 E) lies on the right bank of River Narmada in Tehsil, Kukshi, District Dhar, Madhya Pradesh. The ancient settlement is locally known as 'Vanitkhera'. It was first reported in October 1990 (Ota 1990-91: 76-77 and 1992: 4) by the author. Subsequently, as a part of salvage archaeological investigation of the submergence area of Sardar Sarovar Dam on River Narmada, this site was taken up for small scale excavation in 1995-96 with a view to ascertain the nature of cultural remains between Chalcolithic and Early Historic cultural periods in the area if there is any, and to further establish its stratigraphical context.

The excavation at this site has yielded a three-fold cultural sequence—Chalcolithic (Period-I), Iron Age (Period-II) and Early Historic (Period-III). The Early Historic period was the most prolific at the site that succeeded Iron Age without any break when it becomes a major settlement on Narmada. On numismatics evidence and other contemporary associated antiquities, it seems that the site continued to be occupied until about 4th Century AD.

Excavations revealed a large scale conflagration at the settlement, burning most of the houses during this period. The houses of this period were of mud bricks as well as burnt bricks and had walls made of mud and wattle and daub. Handmade tiles were used for the roofs. The layout plan of the successive houses in the settlement remained same all throughout the Early Historic period. Among the noteworthy structures are the granaries, the elaborate

drainage system wherein drains from two houses come to join as one which in turn empties into a ring well and house complex made of mud bricks.

The Early Historic deposit has also yielded the evidence of the presence of various craft specialists comprising potter, goldsmith, coppersmith, bead-maker, conch shell worker, bone-tool maker, etc. The assumption based on these finds is that the site might have played a major role as a trading centre which is further substantiated by the occurrence of a good number of coins, a few seals and sealing. Coins comprise mostly uninscribed copper cast coins and tribal coins. Besides, a pot-sherd, bearing first century BC Brahmi characters, has also been collected from the excavations.

The various other antiquities from this period comprise copper objects like bowls, bells, antimony rods, bangles, finger rings, figurines, fish hook, etc.; iron objects like axe, hoe, ladle, arrowhead, nail, fish hook, etc.; a few gold and lead objects; beads of semi-precious stones and terracotta; objects of shell and bone bangles, bone points, carved handles, carved ring, etc. Various terracotta objects recovered during the excavations include skin rubbers, bangles, ear-studs, gamesmen, sling balls, hop-scotches, and terracotta figurines comprising human and animal images.

Of all the antiquities, the unique find is a wooden seal, which is probably the earliest evidence of its kind in the country. This wooden seal has been recovered from Trench



Findspot of wooden seal

Side view of the wooden seal



Inscribed surface of the wooden seal

Positive impression of the wooden seal



Fig. 1

ZJ2, quadrant 2 (Fig.1). It has come from layer (2) at a depth of 62.0 cm below surface. This seal is lenticular in shape with 1.9 cm in length and 1.1 cm in width. The thickness of the seal is 1.4 cm. The knob portion is broken (Fig.1), which was possibly rounded. The seal has been prepared by chiselling a piece of wood from all sides to obtain a smooth surface, the marks of which can still be seen on the surface. From the size of tree-rings, it seems that the wood log from which the present seal is prepared must be minimum 6 cm in diameter, if not more. Subsequently, it has been heat-treated at the surface with a view to make it hard and to increase its longevity. The seal was cracked into pieces while it was recovered which was subsequently mended. The cracks along the tree rings are also noticed on the seal surface (Fig.1). In fact, the wood fibres are along the thickness of the seal. The seal has a shining surface that was probably resulted due to constant use. The present weight of the seal is 1.75 gm.

The inscription engraved in intaglio, i.e., negative manner, on the seal from right to left reads *Dh(a) ga ka sa* in the genitive case and tree-in-railing and ladder sign to the left (Fig.1). Palaeographically, the characters can be assigned to the 2nd Century BC. The inscription on the seal suggests probably the name of an individual. The two signs to the left are very interesting. Of these, the right side symbol depicts tree in railing that is found on contemporary local and tribal coins. The engraving of the tree canopy of the symbol has been done with three strokes. After engraving the bottom convex line, the top concave line was engraved. While doing so a gap was generated to the right. Therefore to connect both the lines fully, the third stroke was drawn to the right. As a result, it looks like a fish instead of tree canopy. The symbol to the left of this tree in railing symbol is a three-stepped ladder, which is

also noticed on contemporary coins.

Based on the pattern of strokes of the letters in the inscription, it is clear that the ladder sign has been adjusted at the left end in the available space on the seal. Pattern of the grooves, on the other hand, shows U-shaped incuse with splayed-out arms. This suggests that to inscribe the legend and the symbol, the engraving tool that has been used must be of metal with sharp wider end and not pointed. Further observation of the groove pattern indicates that the scratching has been done from one end to the other, and from top to bottom. As a result, the initial end of the groove is wider than the other end.

While concluding, it may be mentioned that we have several examples of inscribed wood from historical period, but none of these goes back to the 2nd c. BC, except the evidence from Bhaja (Mitra 1971:151). Further, it is not known whether wood was used for seal making in ancient times or not. But the present evidence undoubtedly establishes the fact that wood was one of the materials in use for preparing seals. However, due to non-durable nature of the material, it might not have been preserved at many sites.

Acknowledgements

I am extremely grateful to my colleagues N.G. Nikosey, N. Taher, Rahul Bhonsle, N.K. Nimje and others for their cooperation during the excavation. I also owe my sincere thanks to the villagers of the area who cooperated during the excavation in spite of the fact that they lost their valuable heritage and history forever due to submergence. My thanks are also due to Dr. B.R. Mani for going through the manuscript and confirming the reading of the legend.

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Discovery of Pictorial-cum-Epigraphic Depictions of Performing Local Rituals of the Ancient Magadha by the Traders/Travellers from Gandhara Region

In the extremely remote, inaccessible and dangerous forested hills (Northern extension of the Chhotanagpur Plateau) of Nawada District in Bihar and Giridih District of the recently formed Jharkhand State, 96 caves/rock-shelters were discovered by the writer for the first time in the winter season of 1993-94. Some of these caves/rock-shelters contain a large number of Prehistoric & Historic paintings besides rare Kharoshti, Kharoshti-Brahmi, Brahmi and Shākh inscriptions. A large number of Stone Age tools, bone pieces and some potsherds were also found in and around these caves.

However, it was very amazing to discover depiction of human figures in Scythian or Yueh-chih dress (comprising of long coat, trousers, boot and tall cap) performing some local rituals. Names of such persons were also written in Kharoshti/Kharoshti-Brahmi/Brahmi scripts. It is apparent from the dress, script and descriptions that these persons were traders/travellers hailing from the North-Western region of the Indian subcontinent. We do find references in the ancient texts regarding performance of certain local rituals of Magadha by these travellers/traders. But for the first time the writer has discovered pictorial-cum-graphic evidence of such practices in the extremely remote and dense forested hill of the ancient Magadha. Detailed study of the rock inscriptions also indicates that the ancient forest trade route connecting Pataliputra/Bodh Gaya to the ancient sea port of Tamralipti (Tamluk in Midnapur District of West Bengal) passed through this region and some of the caves/rock-shelters lying on this route were used as resting place (sarais) by

the traders/travellers including those hailing from the Gandhara and the adjoining regions during their journey from Pataliputra/Bodh Gaya to Tamralipti and vice versa. It is apparent from the paintings and inscriptions found in these caves that certain Kharoshti/Kharoshti-Brahmi using traders/travellers had developed faith in some local rituals and they used to perform these rituals for fulfilling their wishes.

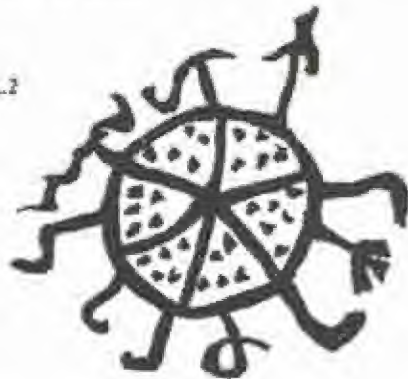
A Ritual for Harming Enemies by Drawing Six Spokes and Dots within a Circle

In the thickly forested Ranigadar Reserve Forest of Nawada District in Bihar an important Palaeolithic cave containing rock paintings and ancient inscriptions was discovered by the writer on 17th June 1996. It was spontaneously named "Mystic" and numbered RS.II A.2. This shelter is made of a huge granite boulder. There are several other rock-shelters in the vicinity but, they do not contain any paintings. A stream flows to the north of the painted rock-shelter. Besides potsherds, tools of Lower and Middle Palaeolithic as well as Mesolithic periods have been found in front of the shelter.

This cave (RS.II.A.2) measuring 21.9 m in length, 5.4 m in width and 3.3 m in height faces north-west. One of the cavities in the wall contains two circles, one rectangle and a figure of a wild animal being dragged by a man. Another cavity to its right contains a concentric circle. The circles and rectangle superimposed over earlier faded paintings have dots and spokes indicating their ritualistic

nature. The circle (diameter 10 cm) in the centre of the larger cavity and lying between the concentric circle on top and the animal figure, contains six spokes. There are five dots in each space between the spokes except one which has six dots. An ornamental Kharoshthi inscription appears outside and along the rim, with the lower ends of the letters rooted on the rim as under-

RS - II A.2



The inscription has been deciphered by B.N. Mukherjee an authority on the Kharoshthi script, as mentioned below-

Text- '*Naha Saga Aminashenam Madhatre*'

Translation: Naha, the Saka forsakes (or injures) Aminashena.

Explanation: It appears that Naha, who belonged to a Saka family, apparently hailed from the north-western part of the Indian subcontinent or the homeland of Kharoshthi had developed faith in some local practices prevalent in the area while travelling on this ancient forest route connecting Pataliputra to Tamralipti. Naha believed that by drawing the above mentioned circle and performing certain rites he would be able to harm his enemy - Aminashena. This diagram with the inscription is the earliest datable epigraphic evidence of such a practice in India (Mukherjee 1997). Language of the inscription is North-Western Prakrit. Palaeographically, the inscription has been dated to c. 2nd century AD.

Performing a Ritual for Getting Favour of the Goddess of Wealth (Laxmi)

The custom of making a design or diagram consisting of a cross within a circle is well known for getting the favour of Laxmi (goddess of wealth). I was lucky to discover a rock-shelter in the reserve forest of Jharnawa (in Nawada District of Bihar) where we find the earliest datable epigraphic-cum-pictorial evidence of such a practice. Details of the discovery are given below-

The above-mentioned rock-shelter discovered by the writer on 22nd January 1994 was numbered as RS.III.A.2. It measures 9.75 m in length, 3.21 m in width and 2.73 m in height. Some Palaeolithic tools made of quartzite and Mesolithic tools made of quartz/chert were also found in this shelter. A rivulet flows in front of the rock-shelter at a distance of above 50 m in the south-east direction. Behind the shelter and to its south-west is a cave, ideal for living. The painted shelter RS.III.A.2 contains a large number of prehistoric and historic paintings as well as several very important inscriptions in Kharoshthi, Brahmi and Kharoshthi-Brahmi datable to c. 1st century BC to 8th century AD. Most probably this rock-shelter and the cave behind it lay on the ancient forest route connecting Bodh Gaya/Pataliputra to Tamralipti. It appears that the cave behind this painted rock-shelter was used as a Sarai (halting place) by the traders/travellers including those from the north-western region of the Indian subcontinent for taking rest on their way to Pataliputra/Bodh Gaya to Tamralipti and vice versa. While staying at this place some of the travellers/traders used to perform certain local rituals in this painted rock-shelter.

The entire ceiling and the frontal wall of RS.III.A.2 are full of paintings and inscriptions. On the extreme right portion (from the reader's point of view) of the frontal wall there is a standing human figure wearing Scythian or Yueh-chih dress (consisting of a long coat, trousers and boots minus cap) in ochre red colour. Over his head is depicted a cross inside a banded circle which he is holding with his upraised left hand. While in his outstretched right hand there is an unidentified figure. There is a Kharoshthi-

Brahmi inscription painted in white colour above the diagram.

R.S.III.A.2



The first letter of the inscription is Brahmi 'xri' and the following two letters are Kharoshti 'vra' and 'ta'. The term "*Sri-Vrata*" denotes a religious vow, pertaining to the worship of 'Sri' or Laxmi, i.e., goddess of wealth. The letters of the term are written in such a manner that they together appear like a design. Palaeographically this inscription can be assigned to c. 2nd century AD (Mukherjee 1997). There are a number of Kharoshti letters to the right of the diagram (from the reader's point of view). The letters can be read vertically as "*Thispajhuamma*" which probably refers to the person who performed the ritual '*Sri Vrata*'.

The above-mentioned diagram or design for performing a ritual for obtaining favour of Laxmi is a well known custom. But here in this rock-shelter II.A.2 we get the earliest datable epigraphic-cum-pictorial evidence of such a practice.

Depiction of Garuda-Dhvaja Indicating of Vishnu by a Traveller from Gandhar Region

In the above-mentioned painted rock-shelter

RS.III.A.2, we also find a figure of 'Garuda-dhvaja' painted in red and white, probably drawn by a devotee of Vishnu. Details are given below;

There is a huge cavity in the left portion of the frontal wall (from the reader's point of view), which contains a large number of paintings mostly geometric designs. In the extreme right portion of this cavity there is depiction of a fluted Ionic column with a base and an abacus and a capital; painted in red and white colour. It is copy of a type of Hellenic column as known in Gandhara (Mukherjee, 1998). On top of the column is shown a human/semi human figure squatting with folded hands. The person is wearing a long cap. His face which is turned to right looks like that of a bird (Garuda).

R.S.III.A.2



There is a fragmentary Kharoshti inscription in the space to the left of the column (from the reader's point of view), *Masa... Jasa... Sarosa*. Most probably the figure represents the mythical Garuda, the mount of Vishnu. As such the column, which betrays influence from Gandhara, may be considered as a Garuda-dhvaja perhaps painted by a devotee of Vishnu.

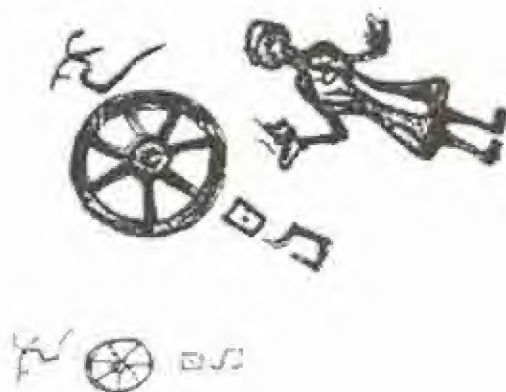
The column itself indicated the knowledge of building activities in the North-West and the Garuda-dhvaja points to the cult of Bhagavata and to one of its Kharoshti using votaries.

Worship of Vishnu (Krishna) and His Sudarshana Chakra by a Saka/Kushan Traveller-

In one of the most fascinating caves RS.I.A.8 discovered by the writer in the Giridih District of Jharkhand on 6th Dec. 1994, a chakra is depicted above a human figure in Scythian dress with a Brahmi inscription perhaps indicating worship of Vishnu/Krishna and his Sudarshana Chakra by a Saka/Kushan traveller/trader. The cave measuring 15.6 m north to south and 12.20 m east to west with maximum height in the centre 1.70 m is situated on top a low ridge. It contains hundreds of Prehistoric and Historic paintings all over its ceiling in various mineral colours such as ochre red, white, black, etc. A large number of Mesolithic tools and some Palaeolithic tools, potsherds, bone pieces and used 'geru' were found inside the cave.

On the ceiling of the cave (above the gallery), there is depiction of a male figure in white colour wearing the Scythian or Yueh-chih dress (a long coat, trousers, boots and a tall cap) and holding a staff or the stalk of a flower by his half-raised right hand. Above and to the left of his head (from the reader's point of view) is shown a chakra (wheel) in white colour.

R.S-I.A.8



There is a Brahmi inscription partly to the left and right of the chakra, which has been deciphered and translated by B.N. Mukherjee as follows:

Text: *Pulathagra*

Translation: *Puratah agra*: (The wheel which is)

The Foremost (one) (is) in the front.

This inscription has been dated to the 4th Century AD. The chakra (wheel) may refer to either Sudarshana chakra of Vishnu/Krishna or a Buddhist Dharma chakra but considering depiction of other ritualistic scenes in the caves/rock-shelters found on this ancient forest trade route, the chakra, may be associated with the Sudarshana Chakra of Vishnu (Krishna). As such the man in the Scythian or Yueh-chih dress was a worshipper of Vishnu (Krishna/Vasudeo) and his Sudarshana chakra.

The above-mentioned pictorial-cum-epigraphical pieces of evidence are the first of its kind which add new dimensions to the study of ancient Indian history. The diagram with the Kharoshthi inscription found in RS.II.A.2 is the earliest datable epigraphic evidence (2nd century AD) in India indicating the performance of a local tribal (Santhal) ritual by a Saka traveller from North-Western region of the Indian subcontinent. Another diagram with the Kharoshthi-Brahmi inscription depicted in RS.III.A.2 is the earliest datable epigraphic-cum-pictorial evidence of performing a ritual for getting favour of the goddess of wealth (Laxmi) by a member of the Saka/Kushan family hailing from North-Western region of the Indian subcontinent in c. 2nd century AD. Portrayal of the Garuda-divaja in the same cave (RS.III.A.2) reveals the affiliation of a man of foreign origin to the Vaishnava sect. The depiction of a man in Scythian dress and a chakra with the Brahmi inscription indicate worship of Vishnu (Krishna) and his Sudarshana Chakra by a Kushan/Saka devotee during the 4th century AD. Besides the ritualistic aspects, the discovery of the above mentioned caves/rock-shelters also throw light on a very important but least known ancient forest trade route connecting Pataliputra/Bodhi Gaya to the famous ancient sea port of Tamralipti. Apparently, these discoveries have important bearings on the history of India and indeed opened up a new area of exploration in Eastern India (Mukherjee 1997).



Location map of the discovery site

Acknowledgement

I am grateful to Prof. B.N. Mukherjee who has very kindly deciphered the inscriptions mentioned in this paper.

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A.K. Prasad

Fresh Investigations in Early Chronology of Nalanda

Taxila, Nalanda and Vikramasila have been recognized as the greatest organized centres for learning in ancient India besides many other seats of scholarship in Kashmir, Kasi, Kanchi, Valabhi and other scattered centres throughout the country which attracted students from far-off places including foreign countries, traditionally to earn knowledge and wisdom for generations together. These centres witnessed various ups and downs during different phases of history. The centres for organized studies were live universities imparting rigorous training in the fields of art, culture, sciences, theological studies, literature and grammar. With the downfall of Taxila, generally attributed to the Hunas around the fifth century CE, the focus shifted to Nalanda and later to Vikramasila as well, although individual houses of scholars and smaller centres including temples, *gurukulas*, *mathas* and *viharas* in different parts continued to impart initial and higher studies.

Nalanda definitely gained the status of an advanced centre for learning during the time of the Guptas around fifth century CE and developed into a large university in the following years, particularly during the rule of the Palas and continued its status till the end of the twelfth century as reflected from archaeological evidence. But the process of development at the site seems to have had a much earlier beginning suggested by tradition and literary evidences which should be given equal importance in understanding the process of development of the place into a university, though there are archaeological indications of earlier antiquity, further substantial probing into archaeological data is required for attesting the traditional beliefs.

In this context, it is suggested that structural phases noticed during excavations of monasteries and shrines in Nalanda indicate on one hand, the continuity of traditional religious and academic activities in these buildings and on the other, repeated constructions over earlier existing structures have been recorded. Extensive ruins of a great Buddhist establishment near village Bargaon, about 11 km north of Rajgir were identified by Alexander Cunningham with Nalanda, suggesting the antiquity of temples and monuments within the span of about 200 years from c. 425 CE to 625 CE or the period after Fa-hsien and before Hsuen-Tsang (Xuan-zang) (Cunningham 2002:30). Fa-hsien had visited Nalanda and called it Nalo, the birthplace of Sariputra, which can also be equated with Nala, Nalaka-gama or Nalika repeatedly mentioned in *Anguttara Nikaya*, *Majjhimanikaya*, *Samyutta Nikaya* or in *Dhammapadam* *Katha* (Prasad 2002:46-55) in connection with birth and death of Sariputra in the same room of the house there or in connection with Lord Buddha's preaching various suttas in the Pavarikambavana at Nalanda. The present village Sarichak towards east from the ruins of Nalanda seems to be the name of the village of mother of Sariputra where he was born. Mahavira is also supposed to have spent three rainy seasons at Nalanda.

Thus, one thing is very clear that the archaeological evidence available so far is either insufficient or does not confirm the tradition of early antiquity of the site. There is no point in not believing the tradition which takes back Nalanda to the Buddha's times around sixth century BCE. The Tibetan tradition, as contained in the work of Lama

Taranatha, records activities in chronological span beginning from the time of Buddha mentioning Sariputta and Mahamoggallana through Asoka's construction of temple and vihara, Nagarjuna's association with the site in the Kushan period and famous Buddhist *acharyas* of the Gupta and later periods.

Writing on the extensive spread of Mahayana, Taranatha (Chimpa and Chattopadhyaya 1970) opines that Nalendra was the birth-place as well as place of nirvana of Sariputta. There was a chaitya of Sariputta there. Asoka built a large temple of Buddha at the site. The two acharyas—the Brahmana brothers built eight temples (at Nalanda) and placed there all the scriptures of the Mahayana. Asoka was the founder of the first vihara at Nalendra. Five hundred acharyas along with Udbhata and his brother enlarged the centre. Rahulabhadra spread the Doctrine (of Mahayana) still further and Nagarjuna made it most extensive. With the help of the art of alchemy, he (Nagarjuna) maintained for many years five hundred teachers of the Mahayana doctrine at Sri Nalendra and at that time a Brahmana of Magadha built one hundred and eight temples at Sri Nalendra. He made these the centres

for the *matrika-dharas* so that the Abhidharma of both Mahayana and Hinayana were not lost. Arya Nagarjuna has been mentioned as upadhyaya of Nalendra. Nagarjuna's disciples Aryadeva and Nagabhaya also stayed at Nalendra. Acharyas Asanga and his brother Vasubandhu stayed at Sri Nalendra, the former for twelve years and the latter was ordained there and studied the three *Sravaka-pitakas* and became upadhyaya of Sri Nalendra after passing away of Arya Asanga. Later Brahmanas and Sramanas were engaged in debates and Acharya Dignaga defeated them thrice.

Although it is quite clear that the archaeological evidence of early antiquity of Nalanda is still insufficient and is more explicit from Gupta period (c. fifth century CE) onwards, but there are certain indications which definitely push back the history and antiquity of Nalanda to many centuries. Such evidence were exposed at Stupa Site No.3 but not studied in details or rather not taken into account seriously. Regular excavations at Nalanda were carried out by the Archaeological Survey of India from 1915-16 to 1935-36 under John Marshall and D.B. Spooner by Hirananda Sastri and J.A. Page. During this

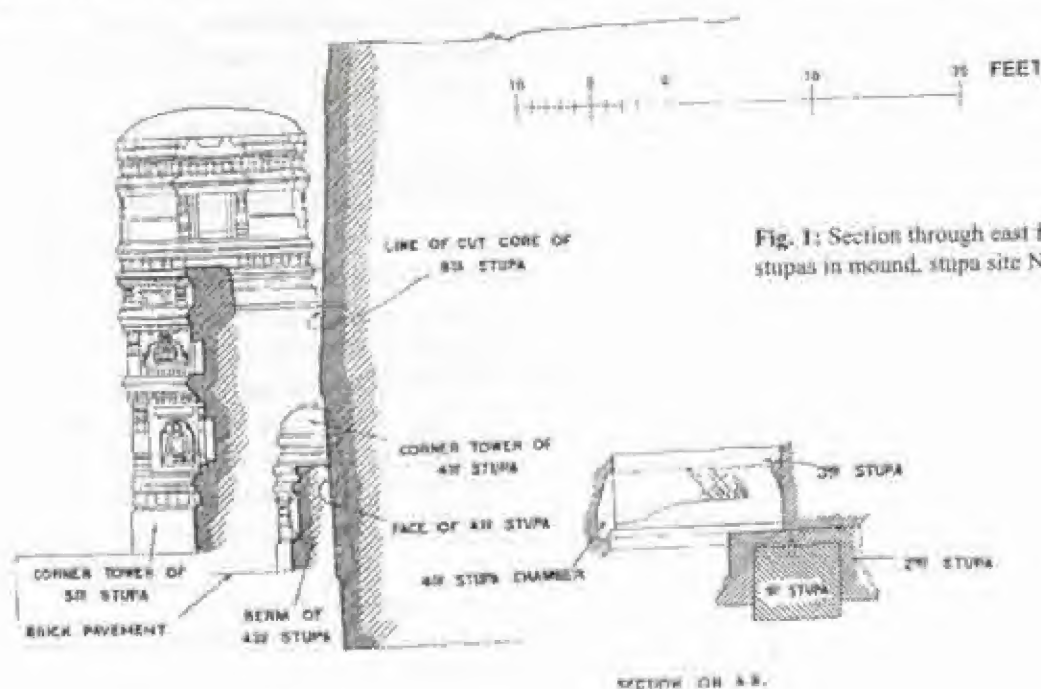


Fig. 1: Section through east façade showing earliest stupas in mound, stupa site No. 3, Nalanda

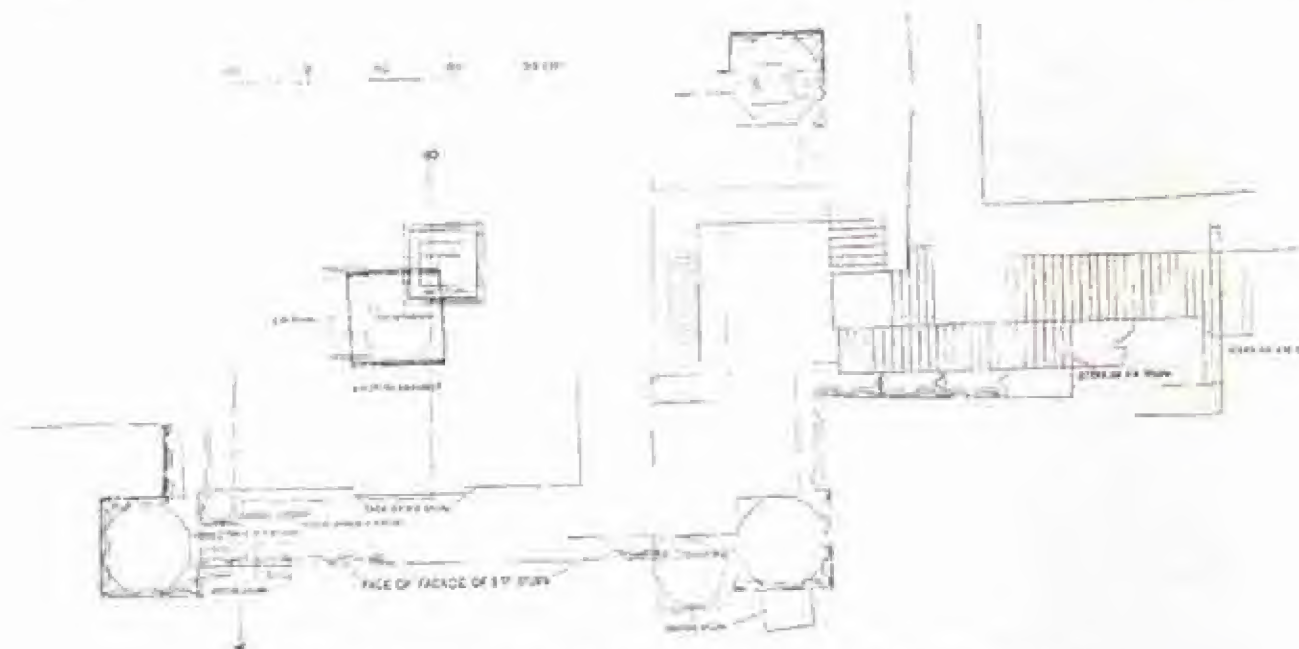


Fig. 2: Plan showing position of earliest stupas inside mound, stupa site No. 3, Nalanda

period a large area was excavated and many monasteries, stupas, shrines and temples were exposed but in the absence of new scientific techniques involving the study of stratigraphy, classification of ceramics and minor antiquities, organic samples for absolute scientific dating and in view of still more areas remaining to be excavated, we may hope that future excavations would definitely confirm the early antiquity of the site. We may discuss here about the excavation of Stupa Site No.3 which no doubt indicates the evidence of antiquity of the site several centuries earlier than what is normally mentioned.

The Stupa Site No.3 was initially called a vihara in 1916-17 (Marshall 1916-17) and later as Stupa Site No.3. Presently some scholars prefer calling it Temple 3 as the existence of a Buddha shrine at the top of each of at least fifth, sixth and seventh stages of the edifice indicates it to be a temple (Ghosh 1989). It is sometimes also identified with Sariputra-chaitya or stupa.

After Cunningham's identification of the site in 1861, Broadley carried out some unsystematic excavation at site-3 and site-12. Site-3, the tallest of the edifices of Nalanda

"represents the result of seven accumulations, the earliest three of modest dimensions being buried deep under the later ones. The temple of the fifth stage, with four corner towers (Fig.5), had its façade ornamented with stucco figures of Buddha and Bodhisattvas in Gupta tradition, which were encased within the extension of the sixth stage. The level of the shrine at the top rose with each reconstruction with a resultant higher flight of steps at each stage. The runs of the shrine of the last stage with a pedestal for the installed Buddha image are seen at the top. Each stage had its own votive stupas all around, often engulfed in the latter's extensions. One of such stupas, of the fifth stage contained in its core a clay tablet inscribed with sacred text *Pratitya-Samutpadasutra* and dated AD 516-17. Another manifestation of devotion is the enshrinement within votive stupas of clay lumps or miniature clay stupas, each having in its core two clay tablets impressed with the Buddhist creed. The temple of the seventh stage externally measures 130x80 ft." (Ghosh 1989:305).

To locate the earliest structures of the edifice a deep vertical trench was cut from the outermost eastern face of the stupa right through to the centre. The bottom-most

foundations of the earliest phase are about 60 ft. deep from the top of the mound. No relic casket could be located during cutting through a huge mass of solid laid-brick. "Right at the very bottom of the foundations, based on the virgin clay and crossing the narrow pit from north to south, was at least disclosed the smooth face of a low brick structure, corbelled out with two offsets in the form of footings, to which fragments of surface-plaster still adhered." (Blakiston 2002:101).

Its external corner suggested that it was the outer face of the wall. Its distance from the north-east external corner was found to be 9 feet. Later the inner face of the wall was also noticed which enclosed the chamber. The remains of the innermost structure, though did not yield any relic-casket, was found to be square in plan with 5 feet 8 inches a side and no higher than 4 feet 6 inches, apparently the base of a little square stupa. The size of bricks used in this earliest structure is mentioned to be 18 inches x 13 inches x 4 1/2 inches which could be bricks of Maurya period and not later than it on the analogous ground of evidence from other Mauryan sites, such as Pataliputra (18 x 11" x 2 inches), Bhita (20 x 13" x 3 inches), Kushinagar (18 to 19 x 12 x 3 inches), Samath (15 to 20 x 10 to 14 x 3 to 3 1/2 inches), Sravasti (17 to 21" x 9 to 14" x 3 to 3 1/2 inches), Vaisali (18 to 19 x 10 to 13 x 3 inches), Rajghat (18 x 11 x 2 inches), Kausambi (18 x 12 x 2 1/2 inches) (Mishra 1989:161-182). Though the Maurya tradition continued during Sunga period, the size of bricks were gradually reduced which became quite apparent during the Kushan period when its size was normally 36 x 24 x 6 cm or around 14" x 10" x 2 1/2 inches.

The 2 ft. high outer wall with its plastered surface encasing the lower earliest structure represents the base of a second stupa that had been built over and around the first. A little above these lowermost structures, but located slightly to the south-east of them, the low remains of a later chamber, measuring about 9 ft. north-south and 12 ft. east-west (revised in the year 1926-27 as 11 ft. 6 inches east-west and 5 ft. 6 inches north-south) filled with earth and debris attached to a low platform with a rounded

concrete top were found. This was the third stage of enlargement of the structure. The torsos of two mutilated small plaster images in relief were noticed besides a very small fragment of a 'black glazed pot' from the earth filling which seems to be either a sherd of Northern Black Polished Ware or black-slipped ware as these pottery types were not popularly known to the excavators in 1925-26 as their nomenclature was fixed during 1940s.

Excavation work at the Stupa Site No. 3 reached to a logical conclusion in the year 1926-27 when more parts of the edifice were exposed through a solid mass of brick work, 40 ft high with dismantling and removal of over a lakh and a quarter cubic feet of laid brickwork in front of it. The excavations proved that instead of three there were four earliest constructions at the site. Besides the earlier mentioned three stages, it was found that in the fourth stage there was a low hollow chamber about 12 ft 6 inches square with rough overhanging corbelling around the sides, which was filled with earth and its floor was 1 foot above the third structure. The chamber was perhaps made to accommodate relics which were not found there. For proper preservation these earliest structures were filled up after excavations.

The two larger stupas at fifth and sixth stages with top shrine of the seventh stage were most probably constructions belonging to the 6th century onwards as reflected from their artistic embellishments and the evidence of inscribed clay tablet mentioned earlier. The corner towers with beautifully sculpted figures of Buddha and Bodhisattvas in stucco, terraced structure of the stupa, the flight of steps, circumambulatory pathways are representative of late and post-Gupta art and architecture. In course of clearing the passage between stucco-covered façade and the earlier stupa inside it, the remains of the little corner tower of the stupa was exposed which gives a picturesque idea of stupa below the stupa even at the later stage of the construction. Thus, the evidence of four earlier stages of construction of edifices prior to the sixth century CE indirectly suggests earlier antiquity of the site which may well go back to the Maurya period for the earliest

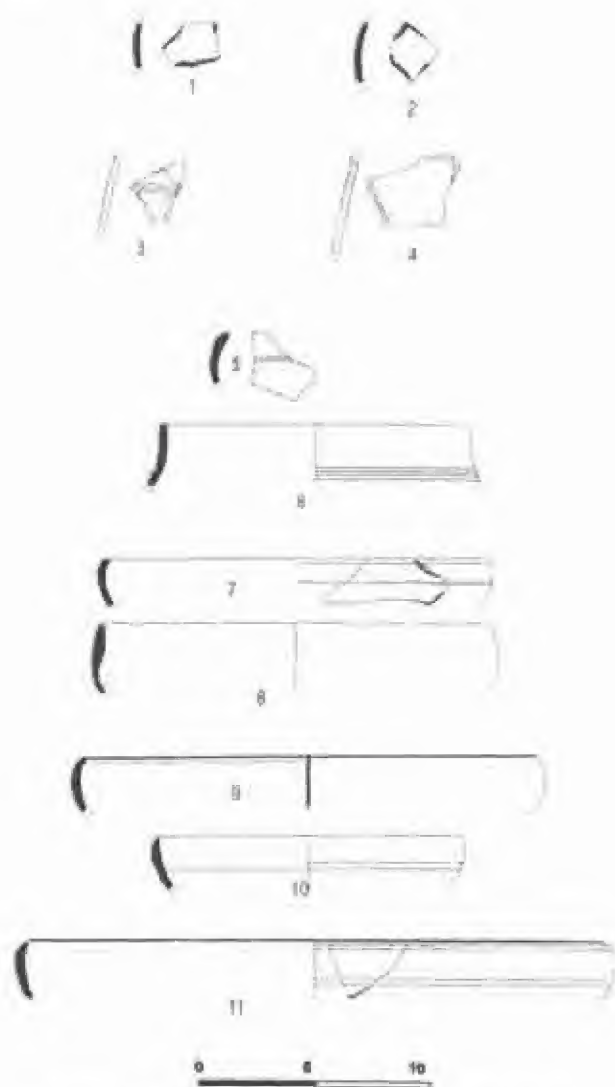


Fig. 3: Black Slipped Ware (1, 6-8, 11); NBPW (2-4, 9),
Nalanda



Fig. 4: Red ware (1, 3-4); Black Slipped Ware (2, 6-8);
Black-and-Red Ware (9), Nalanda

construction at the site.

During 2004-05, two interesting brick structures were exposed in course of scientific clearance towards south-east of Stupa Site No.3 which were noticed by the author in February 2006. The first is a Panchayatana temple with four stucco wheels, two each in the longer axis of the platform on its eastern and western faces, giving the impression of a *ratha* or chariot moving towards north (Fig.5). The conserved platform measures 8.44 X 6.24 m. The roughly square central shrine is 3.08 X 2.95 m having the thickness of its extant parts of walls measuring 78 cm. Out of the four possible subsidiary shrines, remains of only the north-eastern one have survived which measures 1.25 m in north-south and 1.04 m in east-west direction. The normal size of bricks was found to be 25 to 27 X 20 X 6 cm. The diameter of the stucco wheel (Fig. 5) of north-eastern side was found to be 87cm. The south-western wheel is also of the same size. Other two wheels have been badly damaged inside the niches cut in the platform to accommodate them. The other important brick structure is the remaining part of an apsidal shrine (Fig. 5) to the west of the former. Its rectangular part is almost lost which had the width of about 5.75 m and the existing height of the semi-circular part is 34 cm with 55 cm of the thickness of the wall. There is a brick pedestal 88 X 84 cm in the apse with a height of 68 cm.

In this connection the author explored three archaeological mounds in the vicinity of Nalanda monastic complex to its south-west around Jagdishpur village, within 2 km distance in the second week of February 2006 and noticed the evidence of Northern Black Polished Ware, black-slipped ware, black-and-red ware, red ware (Fig.3) from Juaffardih. The mound has a diameter of about 50.0 m and a height of nearly 10.0 to 12.0 m from the surrounding ground level and may represent a stupa with stone figures of seated Buddha and other fragments located on the north-eastern side. A water-body is located towards south-east of the mound. About 500 m to its west is a mound called Garh or Garhpar which seems to be another early historic monastic establishment with ceramics

including black-slipped ware, black-and-red ware, red ware and other associated types and shapes (Fig.4). The site measures around 150 m in north-south and about 80 m in east-west direction with a height of about 4 to 5 m. A carnelian bead was also found there. About 1km to its south-east is the mound called Rukmini-Sthan which has a huge statue of seated Buddha in Pala style within a recently constructed temple and the ceramics of the site include shapes and types of red ware and black ware of c. 9th-10th century CE. The mound is around 200 m in north-south and about 100 m in east-west direction. A broken terracotta votive stupa was found from the surface in the exploration. The cultural assemblage of the first two sites definitely suggest a very early antiquity which may find a parallel if further excavations are carried out at these sites and also in the main complex at Nalanda.

Finally, in view of the firm tradition of early antiquity of the site as contained in the Buddhist texts, the evidence of Stupa site No. 3 requires further detailed study besides archaeological investigations afresh at the site and in its neighbourhood to confirm the beginning of the settlement in and around the extensive area of the monastic complex of Nalanda University. The evidence of brick size of the earlier stage of Stupa site No.3 and that of 'black glazed pot' being possibly a sherd of NBPW, together with the seven stages of relative chronological succession indicate the possibility of dating the earliest stage of structure to the Maurya period, if not earlier. A thorough exploratory survey around the area followed by fresh and planned problem-oriented excavation at the site may reveal astonishing facts on the likelihood of the presence of hitherto unknown earlier stratigraphic sequence.



Corner tower of Stupa Site No.3 (Fifth stage)



Chariot shrine



Stucco-wheel of the Chariot shrine



Apsidal shrine

Fig. 5

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Faunal Remains from Agiabir, Dt. Mirzapur, Uttar Pradesh

The site of Agiabir (25°13'52" N; 82°38'41" E) is located on the right bank of River Ganga in District Mirzapur, Uttar Pradesh. It lies about 2 km south-east of Katka railway station on the Varanasi-Allahabad section of the Northern Railway. The site was excavated by Purushottam Singh and Ashok Kumar Singh of the Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University. The ancient settlement extends in an area of more than a kilometre along the river. The main mound measures about 500 x 500 m. The excavations were carried out in the western part (ABR 1) and eastern part of the settlement (ABR 2) (IAR 1998-99, Singh and Singh 2001).

This report deals with the study of animal remains recovered from the excavations. These were studied at the Archaeozoology laboratory of the Deccan College, Pune, following standard procedures of faunal analysis. Bone identification was carried out upto the species level by comparing it with the modern reference skeletal materials housed in the laboratory. The overall bone preservation is fairly good. Bones were recovered from the first three periods at Agiabir. The period-wise study of the animal bones and their identification is presented in Table 1.

Period I (Narhan Culture): This period was documented in the lowermost deposits. The ceramic assemblage comprised of Black-and-Red Ware, Black-slipped Ware and red wares. Fragments of burnt clay with red marks and patches of floor, ovens, postholes, were recorded. Important antiquities recovered were net sinkers,

bone points, clay lamp, etc. Also present were a large number of animal bones.

A total of 329 bones were studied, out of which 118 could not be identified due to the very fragmentary nature of bones. Total 12 species of animals are represented (Table 1). A majority of the bones belong to cattle and buffalo. As some of the bones of these animals were difficult to distinguish specifically as of cattle or of buffalo (*Bos indicus* or *Bubalus bubalis*), they were grouped as *Bos/Bubalus* sp. However, the domestic cattle (*Bos indicus*) could be identified specifically from the horn cores and bones of the skull, mandible, metapodials, phalanges, etc (Fig.1). While the buffalo (*Bubalus bubalis*) was identified by two bones, one of the scapula and the other of a third phalanx. The domestic goat (*Capra hircus*) is represented by mostly dental fragments. A few bones in the sheep/goat size range which could not be identified to species level were grouped together as Small Ruminant. The domestic pig (*Sus domesticus*) is represented by one portion from the right maxilla having the third and second molars (M3 and M2).

Very few wild species are present in the collection. Among these, a fragment from the antler of barking deer (*Muntiacus muntjack*) was identified (Fig.2). One part of a femur of a carnivore smaller than that of a dog was also found whose species could not be identified. The hare (*Lepus nigricollis*) is represented by a part of the pelvis (Fig.2). Two long bones of a bird were identified in the collection but species identification was not possible due to lack of identifiable body parts (Fig.2). Three very tiny

bone fragments belonging to a freshwater fish are present (Fig.2). Two long bones of a rat were represented. A few bones showed traces of charring as well as chop and cut marks. Some of the bones were intentionally modified and used as bone tools. Of interest are the cattle metapodials which after meat removal were cut at the mid shaft just above the trochlea and probably modified into tools (Fig.2). In the collection a piece of human femur was also found.

Period II (Pre-NBPW, with iron): Traces of burnt floors, ovens, silos, post holes were recorded. Ceramics were mainly of Black-slipped Ware and red ware with an absence of Black-and-Red ware. Antiquities comprised of semi precious stone beads, bone points, etc. As compared to Period I, the number of bones is limited (72), so also the species represented. Only 5 species were identified of which a majority of bones belong to the domestic cattle (*Bos indicus*) (Table 1). The horse (*Equus caballus*) is represented by one isolated tooth (premolar) from the maxilla (Fig.3). The donkey (*Equus asinus*) is identified by the first phalanx and two fragments from the metacarpal (Fig.3). Two parts of a mandible belonging to the domestic pig (*Sus domesticus*) are also present (Fig.3).

Period III (NBPW): In this period also there is similar evidence for post holes, rammed floors and ovens. Main ceramics are Black-slipped Ware and NBPW. Small finds include beads of terracotta and semiprecious stones, bone points, copper and iron objects, terracotta discs, faience beads, etc.

The number of animal bones is very few (36). Five species are present of which the cattle predominate (Table 1). The horse is represented by a first/second molar tooth (Fig.3). Three bones belonging to domestic pig (*Sus domesticus*) were identified. These comprised one isolated premolar tooth and two bones from the mandible, which were charred. The domestic goat (*Capra hircus*) is represented by bones from the humerus and the mandible. Some of the long bones show charring and cut marks.

Period IV (Sunga-Kushana): Main ceramics found are red wares with vase, sprinkler, and lugged-karahi types.

Antiquities comprise copper coins, terracotta figurines, iron objects, ivory seal, etc. No animal remains were found in this period.

Period V (Gupta and post Gupta): From this period no animal bones were available for study.

Conclusion

Animal remains have been recovered from the first three periods (Narhan, Pre-NBPW and NBPW) at Agiabir, although those from Sunga-Kushana, Gupta and post Gupta periods were not available for study. As we have discussed above, the predominance of faunal remains at Agiabir is found in the Narhan culture period. More than 75% of the total collection of faunal remains is found in this period. Almost all the important domestic animals such as cattle, buffalo, goat and pig are represented in all the three periods. However, horse and ass are identified only in the Pre-NBPW and NBPW periods. The abundance of cattle and buffalo bones in the collection underlines the importance of these animals in the food economy at Agiabir. The importance of secondary products such as milk, hide, dung, etc. of these animals may have been the other reason. It appears that some of these animals such as cattle, buffalo, horse and ass were used as beasts of burden. In the total collection of faunal remains from this site very few bones of wild animals were found. Probably, in an agro-pastoral community, hunting was of secondary importance. One bone each of barking deer (*M. muntjack*) and hare is found in the Narhan period. The presence of bird bones and fish bones throws light on the snaring of birds and fishing activities of the inhabitants in the Narhan culture period. A few bones have been modified as bone tools. As the sample size studied was quite small more detailed aspects of the overall subsistence pattern based on fauna is difficult to reconstruct.



Horn core of *Bos indicus*



(Upper row-left to right) maxilla and first phalanx of *Bos indicus*; (bottom row-left to right) mandible and second phalanx of *Bos indicus*



Carpal metapodials of *Bos indicus*

Fig. 1



a

(Upper row) pelvis of *Lepus nigricollis*;
(bottom row-left to right) antler fragment of
Muntiacus muntjak and two long bones of an
unidentified bird



b



c

Modified bones and bone tools

Fig. 2



Isolated premolar of *Equus caballus*



(Upper row-left to right) proximal and distal portion of metacarpal of *Equus asinus*; (bottom row-left to right) isolated first second molar of *Equus caballus* and first phalanx of *Equus asinus*

Fig. 3

Table 1: Species representation in Period I, II and III at Agiabir

No:	Species	Pd. I No. of Bones	Pd. II No. of Bones	Pd. III No. of Bones
1	<i>Bos/Bubalus</i> (cattle/buffalo)	148	5	10
2	<i>Bos indicus</i> (cattle)	28	53	20
3	<i>Bubalus bubalis</i> (buffalo)	2	-	-
4	<i>Equus caballus</i> (horse)	-	1	1
5	<i>Equus asinus</i> (ass)	-	3	-
6	Small ruminant	4	-	-
7	<i>Capra hircus</i> (goat)	18	-	2
8	<i>Sus domesticus</i> (domestic pig)	1	2	3
9	<i>Muntiacus muntjak</i> (barking deer)	1	-	-
10	Carnivore unidentified	1	-	-
11	<i>Lepus nigricollis</i> (hare)	1	-	-
12	Bird	2	-	-
13	Fish	3	-	-
14	<i>Rattus rattus</i> (common house rat)	2	-	-
	Unidentified	118	8	-
	Total	329	72	36

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Cupule Occurrences in Goa

Cupules are cup-like hemispherical percussions engraved on the surfaces of bedrock and vertical rock. A large number of prehistoric rock art sites in India have yielded cupule marks on the rock surfaces. For example, Bhimbetka in Madhya Pradesh, Bajanibhat in northern Rajasthan, and Dara ki Chattan in the Chambal Valley are among the noted ones. Out of these, Dara ki Chattan is known for its 498 rich cupule marks and assigned to the Middle Pleistocene Period to which belongs the mid-Lower Palaeolithic Culture (Kumar 1995).

Rock Art sites known in Goa are: Curdi, Pansaimal, Kazur, Mauzi and Pirla. Amongst these, Pansaimal (Usgalimal) is one of the largest rock art sites where carvings are made on the laterite bedrock of Kushavati River covering around 4000 sq. m area (Deshpande 2002). These are generally dated to the Neolithic Period of 5000-3000 BC. The engravings found on these sites are animal figures, human figures, birds, grooves and one labyrinth, i.e., complicated linear design.

The discovery of rock engravings at Pansaimal and Kazur by P.P. Shirodkar and Mauzi by Goa Circle of the ASI alongwith local people led to a proper study of the rock art of Goa (JAR 1999-2000). Earlier, S.A. Sali (JAR 1964-65: 8-10) conducted an extensive survey all over Goa State discovering many sites datable to prehistoric and medieval periods. A human figure carved in high relief on the rocky surface was also noticed during the exploration conducted by B.R. Mani, K.P.S. Bhadoria and V.B. Mathadhikari (JAR 1984-85:146). The site referred here

is now under the submerged area of Selaulim dam. Mauzi has yielded evidence for cupule marks. Similarly, in the year 2005, when Pansaimal was visited, a stone tool was found embedded in the sandy matrix filling one of the grooves. But this was certainly a secondary deposit. M. Nambirajan has found many similarities in the style of carving from Pansaimal and Kazur with the rock art of Karnataka, such as Hampi, Sonda (Sirsi Taluk, North Karnataka) and Holaluru (District Shimoga), belonging to the Megalithic culture-complex dateable to 1500-600 BC, which is, however, quite distant in age.

Exploration

Some rock engravings on the laterite bedrock in the campus of Goa University located at Dona Paula of Taleigao panchayat area were also reported to us. On the basis of this information, the officials from Goa Circle of the Archaeological Survey of India along with S. Bagi and Raju Manuel Pereira accompanied by Nitesh Parulekar, a bird-watcher who provided the original information, explored the area. It has been observed that the engravings are actually cupules and were executed on the bedrock. A small seasonal stream flows through the site dissecting the bedrock at some places. The sea is about 2 to 3 km away from the site.

Close to a pump-shed at the University campus, 12 cupules were found arranged in two parallel lines of six each. The total length of this linear format is 36 cm. Similarly, around 40 cupules in several rows were also



Fig. 1: Rock site in Goa

noticed about 100 meter away from the first group. Except one, all the rows are well preserved and have same linear pattern. The same area also revealed an interesting engraving of an anchor-like shape. However, the site only yields cupule marks and not other forms of engravings. From the vicinity, three stone tools, a few small flakes and loose pebbles of quartz were collected.

Another site of the cupules, informed by the locals, is located behind a Krishna temple on the Nagali Hill, about two kilometers away from the University site. Here one group of cupules is in linear form whereas the other group consists of footmark-like shapes grouped in four pairs. The third group of three interconnected grooves on the bedrock was also noticed at the site. The linear form consists of sixteen cupules. They are arranged in two rows of eight each. At three sides of this pair of rows, square sockets are scooped, one on top of the first row and the other two on either end of these lines, measuring about 8 to 11 cm in length and 7 to 9.5 cm in breadth. The diameter of the cupules varies from 3 to 4 cm and depth varies from 0.7 to 0.8 cm. The total length of this linear pattern is 56 cm. Compared to the cupules of the University site, these ones are very shallow.

Adjacent to the linearly arranged cupules are four pairs of footmark-like grooves. Similar types of footmarks are also found at Mausil.

In addition, there are three pairs of interconnected grooves located on the same bedrock. There are two grooves which are connected to each other by a thin channel. The measurement varies for each pair but the forms are the same. This group of carving is found in cluster on the bedrock. The site yields only the cupule marks and no other form of rock art. There is a natural pond on this site. It seems that the water stays there for a long period of time. The vegetation in the area mainly comprises of shrub and grassy patches, used for feeding cattle.

Discussion

The availability of pastureland and water resources suggests that in the past the explored area probably attracted people for grazing cattle as at present. The topography of the region, particularly hilly terrain and dense vegetation along with swampy area suggests that it might have been seasonally occupied by the prehistoric people. Only a limited number of material remains such as a fluted core and a microlith have been recovered from this area. However, during the exploration no evidence of any habitation in the area was noticed.

Recently, from a geographically broader perspective, Bednarik (2000-2001: 37-47) has mentioned that cupules are man made and their recovery at Bhimbetka (rock shelter III F 24) below an Acheulian layer indicates that the date of cupules is at least middle Palaeolithic. Although he dates these sites to the upper Pleistocene, yet the majority occur within the Holocene and may be put in the cultural sequence ranging from the late Acheulian to the early Historical period. He also mentions that cupules are the oldest surviving form of rock art known in the world. However, he points out that the purpose of these cupules is based strictly on modern ethnographic studies and therefore there is no accurate evidence to explain their function during prehistoric times.

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Parvati's Penance: an Unnoticed Sculpture from Bengal

The *Kumarsambhava*, Canto 5, Verses 20 and 23, contains a poignant description of Parvati's penance for attainment of Siva as her bride after having failed to win over Siva through her unparalleled beauty.

Verse 20: *Suchau Chaturṇa jūlatam habir bhujam
suchismita Madhyagata sumadhyama - I*

*Vijita netra-pratighatinim prabhamanasya-
dristih sairtaramaikshata - II*

Verse 23: *Nikamatapa vividhena vahana
nabhascharenhana sambhutena sa - I*

*Tapaatyaye baribhiḥ uksita nabairbhiva
sahasmana samuncha urdhagam - II*

Both the verses mention Parvati's penance. She stood amidst the four fires and watched the sun over her head (Verse. 20). She withstood five fires during the summer; blazing wood on the earth and scorching sun on the sky. Vividhena vahana in Verse 23 has been translated as five fires on the basis of later sources.

Despite the wide-ranging controversy regarding the date of Kalidas and his works, there is a general agreement on the early date of most of the text of the *Kumarsambhava*. It has been observed that the genuineness of the first seven cantos of the *Kumarsambhava* is beyond doubt; but it brings the narrative down to the marriage of Siva and Parvati, and the promise of the title, regarding the birth of the Kumara, is not fulfilled. Nevertheless, apart from the promise of the title, these genuine cantons present a finished

and unified picture in itself. The magnificent figure of the divine ascetic scoring love but ultimately yielding to its humanizing influence, the myth of his temptation leading to the destruction of Kama as the emblem of human desire, the story of Uma's resolve to win by renunciation what her beauty and love could not achieve by their seduction, and the pretty fancy of the coming back of her lover, not in his ascetic pride but in playful benignity, - this poetic, but neither moralistic nor euhemeristic, working up of a scanty Puranic myth in a finished form is perhaps all his own (Dasgupta and De 1977:126-28). This is probably the earliest textual reference to a recurrent theme in the Brahmanical iconography.

I

Among several forms in which Parvati is represented, this particular form enjoys a special position. In a recent work, N.P. Joshi has discussed the iconography of Tapasvini Parvati, mainly on the basis of North Indian sculptures between 1st-2nd century AD, and 12th-13th century AD. Joshi has, in addition, utilized textual data available in the *Purana* and iconographical treatises. In the process, Joshi could identify several image-types like *Ekpada Tapasvini*, *Jagadgauri Hanada Kamada Kshemankari*, *Lajja-Gauri*, *Sriya-Gauri*, *Savitri-Gauri*, *Siddha* and *Lalita*, *Tripura Gauri*, *Samkhadhari*, etc. (Joshi 1996:327-46).

Joshi's study, important on its own right, underscores the problem of text-image co-relations. Many of the images discussed by Joshi do not correspond with the textual

prescriptions in every essential detail. Joshi has tried to accommodate a wide range of *Devī* types with the umbrella identity of *Tapasvini Parvatī*.

Of the diverse forms showing the Goddess in penance, the one associated with the *Panchagni Sadhana* seemed to have evolved relatively early. A fragmentary two-handed Parvatī in the Government Museum, Mathura is distinguished by two *agni-kundas* (brazier holding the fire) on either side of the figure. Datable to c. 2nd century AD, this is, in all likelihood, the earliest representation of Parvatī's penance by fire. Joshi has cited thirty examples from Northern, Western and Central India, datable mostly between c. 7th–12th centuries AD, where the goddess, one set at the base and the other near the shoulder or the head of the *Devī*. In one example, Joshi noticed three *agni-kundas* and in another *agni-kundas* shaped like 'four human figures with flames'. The iconography of Parvatī's penance by fire was standardized by c. 7th–8th centuries with the fire motif defining the image-type.

In Eastern India, more specially in Bengal, Parvatī Panchagnitapa is a relatively rare iconic type. Despite Enamul Haque's assertion (Haque 1992:228), 'dishes with pinnacle-shaped offerings' or 'heaped *naivedya* (offerings) pots' carved on the pedestal of some of the *Devī* images in Bihar and Bengal cannot be identified with *agni-kundas*, this feature is by no means exclusive to *Devī* images. Haque, however, rightly pointed out that 'the sculptors in Bengal have followed both these traditions. We have at least eight sculptures where two braziers of fire have been depicted, either on the pedestal or on the *prabhavale*, and in one case, four *agni-kundas* have been carved, two on the pedestal and two on the *prabhavale*'. Of the nine figures listed by Haque, seven are from North Bengal sites, one is from an unspecified site of Bengal and the other piece may be broadly labeled as of Eastern India origin. Whether the list is genuinely indicative of the geographical distribution, is certainly a debatable issue. But, the concentration of the image type over the historic *Pundravardhana-Varendra* sub-region demands renewed examination of the problem. In the present note, we will discuss one such image, which, by all accounts, is rather rare in occurrence.

II

The image is now housed in the State Archaeological Museum, Kolkata, West Bengal. Collected by Sri P.N. Malakar and Sri R.N. Pal, two employees of the Directorate of Archaeology & Museums, Government of West Bengal from Kaliaganj Police Station in South Dinajpur District, West Bengal in 1963, the image is reported to have come from Jagdala (J.L. No. 68 under Kaliaganj P.S. of South Dinajpur District) (Fig. 1). Carved out of characteristic black-stone, the piece (Acc. No. 05. 294 of SAM) has always been identified as *Devī*, a reasonably broad term which subsumes almost all the specific-forms within its orbit. It was published in a slim guide-book authored by the then Director, Late P.C. Dasgupta under the title, *An Introduction to the State Archaeological Gallery, West Bengal* (Calcutta 1963). This is how Dasgupta described the piece: 'the life-size torso of a *Devī* probably Gaurī wearing *Jatamukuta* from Malda (really South Dinajpur) may be regarded as a master-piece of about 10th century AD, for its pleasing depth and smooth lines which have captured an endearing expression and a divine beauty almost entrancing in appeal'. However, in his notes on the plates, Dasgupta mentioned Jagdala as its find-spot.

The image (61 cm x 43.5 cm) must have been an outstanding work of art. In its life-size proportion, in its textural finish and boldness of execution, it stands out, even in its fragmented state, as an extraordinary sculpture. But for slight mutilation of the nose, the extant portion of figure unaffected by the ravages of time. The goddess wears an elaborate *Jatamukuta*.

That rises like a shaft over her head. It is beautifully decorated with intertwined locks of hair rising from the base of the crown to reach the top in a number of emphatically carved bands, curly locks come down to the shoulder. Below the *Jata* are pearl bands in three rows on either side with a line of pearls defining the centre. On the forehead, the third eye stands out prominently. The carved eye-brows touch the forehead; deeply curved eyes and fleshy lower lips add to the grace of the *Devī*. The neck is defined by three curved lines in descending order. Among



Fig. 1

the jewellery, the pearl-string and a necklace showing the *Vyaghranakha* motif deserve mention. But of great significance is the depiction of a brazier with flames issuing out of it placed at the centre of the shaft like *Jatamukuta*, the leaping flames seem to emphasise the vertical thrust of the crown. In the process the numerous locks of *Jata* and the flames of the fire get integrated into a visually and symbolically coherent composition. And it is the flame of fire represented in the *Jatamukuta* that defines the specific identity of the *Devi* as Parvati performing the *Panchagni Sadhana*.

III

Haque mentions two distinct traditions in respect of the depiction of *agni-kunda* in the Parvati images of Bengal. Haque further suggests that the depiction of four *agni-kundas* in a Parvati image is based on the *Kumarsambhava* verses cited by us at the introductory portion of this paper. As for the depiction of the four *agni-kundas*, the textual source is the *Vrtakhandā* as cited by T.A.G. Rao (1914-16:120, Plate 2) the *Rupamandana* (v. 3). For all practical purposes, the *Vrtakhandā* version and the *Rupamandana* verse are identical, N.P. Joshi, however, draws our attention to the *Padma Purana* version according to which 'she would get herself surrounded by fires on five sides in summers'. Going by the texts, artists-iconographers had more than two options. Apart from the depiction of *agni-kundas*, two or four as the case may be—there was possibility of depicting the sun on the upper-field of the stela. But artists' ability to interpret the intended message of the text went beyond the confines of the *Puranas* or *Silpasastras*. Sculptors of the Jagadala Parvati chose to depict the *agni-kunda* within her matted locks. In

so doing, the sculptor was probably making an attempt at communicating the intensity of the Parvati's penance, *Devi's* ability to transcend physical suffering in its most severe form. Hence, the brazier of fire tucked neatly within the elaborate matted locks. This device becomes a poignant statement of Parvati's unfaltering attachment to the cause for which she was practising such penance.

IV

The discovery of what could have been a life-size image of Parvati from Jagadala is not without significance. As a place name Jagadala is known from different parts of Malda and erstwhile West Dinajpur District. There is a widely prevalent popular view regarding Buddhist affiliation of the place name Jagadala, apparently because of the phonetic similarity with Jagadala, the celebrated Mahavihara of the Varendra during the Pala period. Five such Jagadala are known to us, two in Malda District and three in West (now South and North Dinajpur Districts). H.E. Stapleton (1932:159) during his tour in the Districts of Malda and Dinajpur between December 24–31, 1932 noticed a Jagadala which is a segment of the sprawling Bairhatta complex. Stapleton's account coupled with S.K. Saraswati's report (1932:178-79) leave very little doubt about the non-Buddhist and Brahmanical affiliation of the site. Apart from Stapleton's Jagdala which is kept in Bansihori P.S., nothing is really known about the other two Jagdala in South Dinajpur District. If our image has indeed come from Jagdala under the Kaliyaganj Police Station of South Dinajpur District, then we have virtually no earlier account to fall back upon. But given the dimension and artistic excellence of the place, the area needs to be investigated systematically.

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Recent Discovery of A Chariot Shaped Shrine at Nalanda

The ancient remains of Nalanda University (25° 8' N; 85° 27' E) is located about 90 km southeast of Patna, the state capital of Bihar. History of Nalanda goes back to the days of Mahavira and Buddha, i.e., 6th century BC. It was the place of birth and nirvana of Sariputra, the famous disciple of Buddha. But this place rose into prominence in 5th century AD as a great monastic-cum-educational institution which was founded by Kumaragupta I (413-455 AD) of the Gupta dynasty. Later on the king Harshavardhana of Kannauj (606-647 AD) and the Pala kings of East India (8th-12th century AD) continued to extend their patronage to this establishment. The decline of this institution started during the later Pala period but the final blow came in 1200 AD by the invasion of Bakhtiyar Khilji. The excavations conducted by Archaeological Survey of India during 1915-37 and 1974-82 have exposed the remains of six brick temples and eleven monasteries arranged on a systematic lay out.

In 2004 towards south-western side of the excavated remains, scientific clearance work was conducted with a view to expose the structures underneath. As a result towards the west and southern side of Temple No. 3 at Nalanda, several small structures have been brought to light. These structures are represented by a cluster of votive stupas and a number of miniature shrines of various dimensions and forms. Amongst these, the discovery of a shrine fashioned in the form of a chariot with revolving wheels is the most noteworthy.

The Shrine

The shrine is rectangular on plan, measuring 8.25 x 6.25 m. It is built of burnt-bricks laid with mud mortar. The shrine is facing north as Temple No. 3, the most imposing structure at Nalanda is facing. Presently, it is devoid of any image. The sanctum or *garbhagriha* is square on plan measuring 2.82 x 2.82 m and is approached by a step measuring 1.60 x 0.49 m. The entrance is 72 cm in width. The size of bricks is 30 x 15 x 5.5-6 cm. Erected on a low platform, the fabric of the shrine is designed as the celestial chariot. The platform is adorned with decorative mouldings of bricks and plastered with lime. The chariot-shrine originally consisted of four wheels made of stucco. But unfortunately the south-eastern one could not be traced during the digging operations as the same was damaged earlier and is entirely missing. However, the wheel fixed on the north-eastern side has been exposed intact whereas that of the south-western and north-western one is only partially intact. Attached to the wheels, there is the evidence of small shrines with the dimension of 1.25 x 1.06 m. These were probably meant to house the subsidiary images of the parent deity of which the remains of two have been found during the excavations. Hence, it has been surmised that here there was a *Panchayatana* form of temple. The other example of this category of temple is also attested at Temple No. 12 at Nalanda.

The Stucco Wheels

On the facade of the platform and rear side of the small shrine the rare stucco wheels are augmenting the archaeological significance of the chariot-shaped shrines. The core of the wheels are made of clay mixed with lime and brick jelly to which a smooth surface treatment has been given. The diameter of the wheel is 86 cm. Treated realistically and exquisitely, each wheel consists of an axle, a hub, a felly of 10 cm width and twelve numbers of spokes, which probably symbolize the twelve month of a year, or else zodiac signs. The spokes, formed like lotus petals, are 20 cm in length. The felly is treated with the border

decorated with chain designs.

Chronology

On stylistic grounds, brick size, original working level and the nature of stucco-work the shrine may be dated to 6th-7th century AD, i.e., late Gupta period. The composition of stucco images of Buddha enshrined in the cells of Buddhist stupa at Kesariya in East Champaran District of Bihar, which has been dated to 6th-7th century AD, is also significantly helpful in dating this shrine.

P.K. Mishra

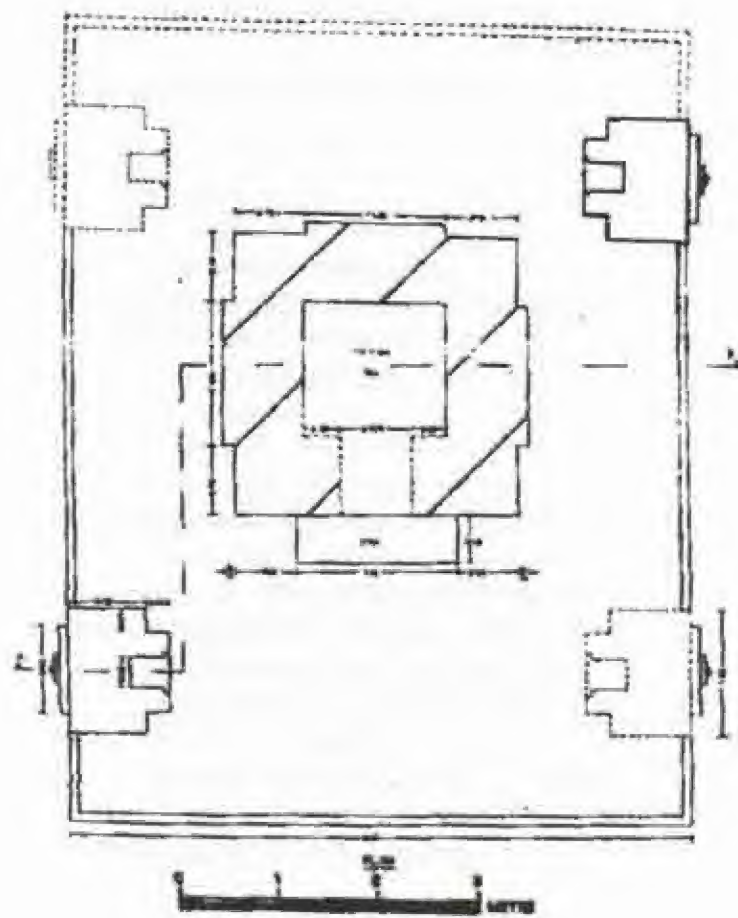


Fig. 1: Plan of the chariot shrine

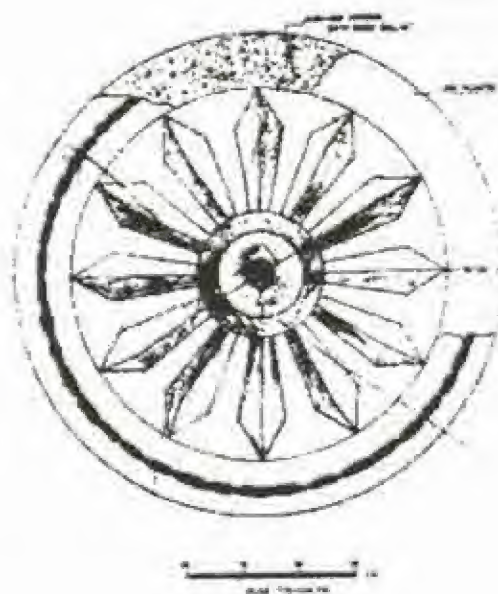


Fig. 2: Stucco wheel

Contemporary Indian and Ancient Iranian Bracelet (*Kada*): A Comparison

The bracelet described as ornamental band or chain worn on wrist or arm, one of the most commonly used objects since ancient times. At many ancient sites in Iran bracelets with animal motifs are frequently reported. However, with the advent of Islam in Iran a virtual decline in the use of such bracelets has been observed. Similar bracelets commonly referred to as *kada/kara* are still in use in India today. This paper is a preliminary attempt by the authors to study the similarities between both modern Indian and ancient Iranian metal bracelets belonging to the first millennium BC. It attempts to gain an insight into the cultural interaction between the two countries since ancient times. It also explores the factors responsible for the decline in the use of such ritual artefacts like bracelets by the ancient Iranians and its continuation in India.

The area of study includes the ancient sites of Iran, namely Lorestan, Susa, Persepolis, Zruiyeh, Pasargadae that have yielded bronze, silver and gold bracelets similar to the one worn presently by certain communities of India (Pl. 1b, 1c, 1e, Fig. 2a, 2f, 2h).

Lorestan, located on the western side of Iran, is one of the important regions known specifically for ancient metal working particularly of the bronze period (Fig. 2a and 2b). In this region also, known as Luristan, the bronze artefacts excavated from the sites are dated between third to first millennium BC. These comprise wide variety of artefacts such as weapons, ornaments, bowls, horse riding equipment such as saddle, toiletry, talisman, etc. Of significance here are the bracelets, which are reported from

most of the sites. These are mainly circular in shape generally having plain and animal motifs at its two closing ends. This type of decoration on bracelet was the typical style adopted by the Lorestan artist to make bronze bracelet. The excavated ancient graves and temples in the south of Lorestan, like Kalmakare, have yielded treasures including such bracelets dating back to first millennium BC.

There are some similarities between Lorestan ancient metal work and Achaemenian art particularly with well known artefacts from site of Persepolis especially the decoration of column tops with Lorestan bronze bracelets. The Achaemenian sites have yielded some bracelets dating to 6th to 4th century BC similar to Lorestan bracelets (Fig. 2c and 2f). The simple decoration on the bracelets of Lorestan dating to the end of the second millennium BC suggests that probably this was the place of origin and development of this art as this site predates the Achaemenian dynasty. This art was probably adopted later by the Achaemenian dynasty. The sites belonging to this period such as Pasargadae, Susa and Persepolis have yielded bracelets similar to the Lorestan bracelets. It is important to note here that during Achaemenian period the extent of their empire had touched the boundaries of India. And during this time cultural contact between the two countries, i.e., Iran and India, had reached to its zenith.

Earlier development of art in the Region

Very high quality samples of bracelets have been found at a number of Scythian sites. According to Ghoshman

(1954), the migration took place during the third to first millennium BC from south of Russia around Caspian Sea to Iran. The people who lived during the same time in Lorestan (west of Iran) have similar culture with residents of Caucasians. Archaeological data from Lorestan shows impact of Scythian art. It is interesting to note that the art of Lorestan, particularly that of the Scythian, falls in the category of the nomadic art, which is well known in the world of archaeology.

Motifs on the Bracelets

Animal motifs have played a noticeable role in ancient art universally. In Iran the popular motifs used were those of lion, eagle, griffins, ibex, ram and only one instance of snake in bracelets, often symbolizing power and authority. Diverse representations of these animals are noted in ancient monuments of Achaemenian dynasty.

During the historical period, i.e., Achaemenian period the majority of bracelets designed were with lion and also in some cases with Ibex motif. In Iranian mythology the connection between horn of ibex and new moon makes it holy. It also represents the importance of this unique animal, which provides with meat, skin, milk and horn for the ancient Iranian people in their day to day life.

The lion and eagle are depicted in the palace of Persepolis and Susa with mythological aspects. As known to us, the lion is one of the strongest animals on earth and the eagle in the sky, both represent power and authority. Hence, are commonly found motifs in Achaemenian art. At Persepolis, for example, some of the relief show the king as slayer of lions, suggesting him as the most powerful being. The Griffin, which is a combination of an eagle's head and wings and a lion's body, having power of both the animals, was a mythical creature developed by Scythian. It was also a popular motif used by the Mesopotamian and Achaemenian artist.

Beside, there are bracelets with special designs such as the gold bracelet with winged animals from Oxus treasure (Pl. 1d), uncovered on the border of Russia and Afghanistan

dating to 5th/4th century BC and is presently placed at British Museum in London (Black 1981: 90-91; Lloyd 1961: 246-256). This motif on bracelet is interesting because we get local variation of the representation of Griffin, i.e., combination of motif of lion, eagle and ibex. Ibex being popular in the region was an added feature in the local development of art; here in this bracelet we see the continuation of lion and ibex, representing half body of lion including fore limbs and lower half body of Ibex including hind legs, horns and ears, and head and wings of eagle. This bracelet is also seen in Achaemenian relief, where it is popularly shown as the Median soldier seen offering the bracelet to Achaemenian kings at Persepolis (Fig. 2g).

The archaeological evidences for the use of bracelets made in gold and silver continued till the end of Sassanian dynasty (7th century AD). However, with the advent of Islam in early 7th century AD in Iran, the wearing of these precious ornaments gradually declined. During this time it was strictly forbidden to wear any kind of gold and silver ornaments as these were permitted during the prayer times (Namaz). As a result, the bracelet, which earlier symbolised power and authority prior to Islam, lost its significance and its use was discontinued.

Kada, the Indian Bracelet

In India since Harappan/Chalcolithic times evidences of bracelets made of terracotta, shells, copper, iron, gold and silver have been recorded. In modern times certain communities in India continue to use bracelets popularly known as *kada* (Pl. 1f, 1g, 1h, 1i). These are also circular at times are plain or decorated. In certain cases, like the ancient Iranian bracelets, these also at their both ends have animal motifs. Mostly commonly used motifs are heads of lion and elephants (Pl. 1f & 1g). These bracelets are used by both sexes and even by children. In general they signify valour, strength, authority, marital status, and also to ward off evil.

In northern India, all the men, women and children of the Sikh community wear plain *kada* made of iron and



Fig. 1: Location of ancient sites in Iran, which have yielded bracelets

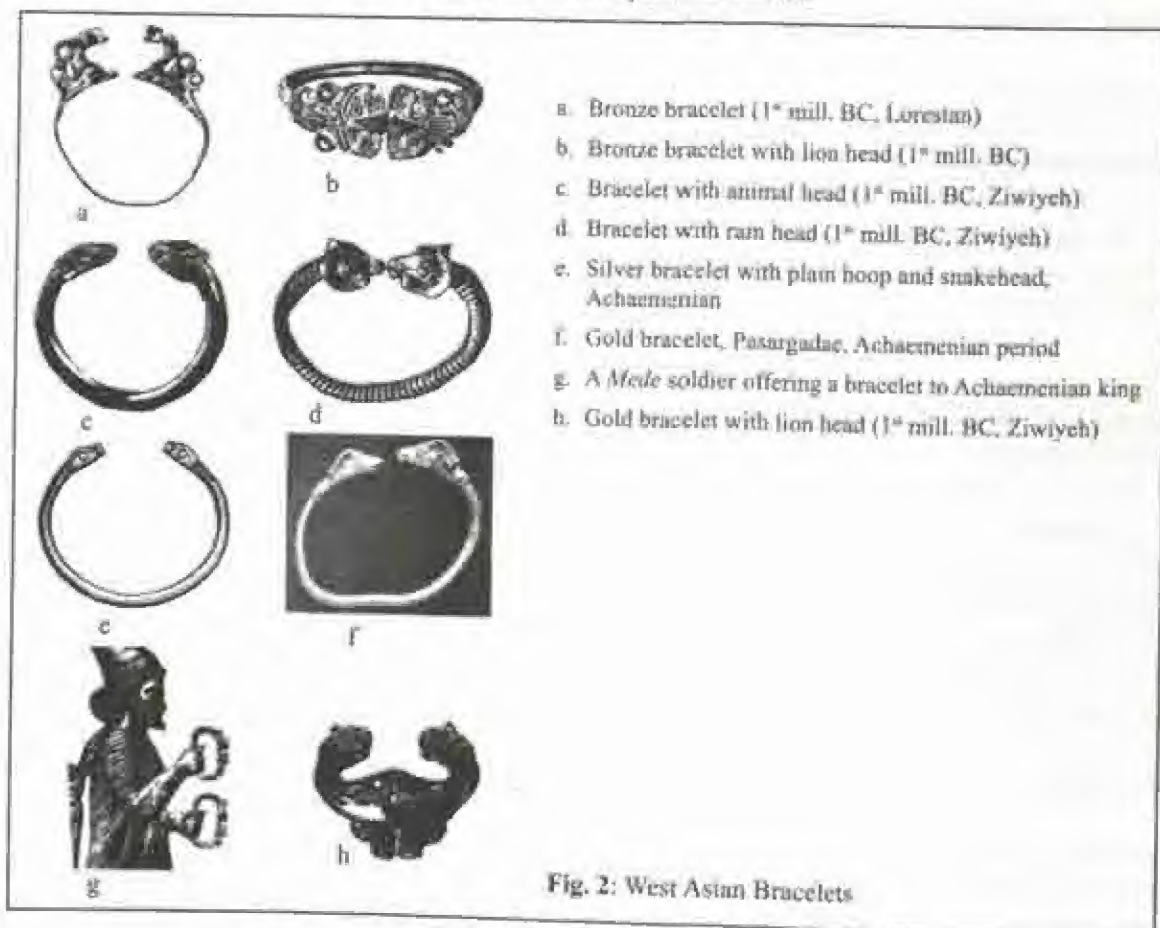


Fig. 2: West Asian Bracelets

steel. These are strictly worn as symbol of their religious status.

In eastern India, like Bengal bracelets made of conch shell, is the symbol of purity of a Hindu wife. A brief religious ceremony is traditionally performed to welcome *Sakti*, the goddess of energy, whose symbol it is, before the bracelet is put on the wrist. An iron bracelet is generally worn on left wrist to ward off ill luck of the husband, and some rich people encase it in gold as well (Pl.1h).

In western part of India particularly in Rajasthan, the use of *kada* is more popular among the men folk. Here men use *kada* as a symbol of royalty and power similar to the ideologies of ornamentation by the ancient Iranians (Pl.1g).

The continuity in the use of bracelet by certain Indian communities has persisted through time despite radical social transformation because of its symbolic and ritualistic significance.

Discussion

A comparison between the ancient Iranian and the

contemporary Indian bracelets has revealed the strong similarity between both. It has helped us to show the interaction between the two countries as far as to the Achaemenian period in respect to exchange of ornamentation like bracelet. Later on this cultural interaction might have continued in the Parthian (247 BC-AD 226) and later in the Sassanian time (AD 226-650.), when the eastern boundaries of their empire had touched the parts of India. This preliminary study on such a common artefact has revealed cultural contact and has given a way for future research.

Acknowledgements

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Animal Representation in the Rock Art of Chotanagpur Plateau

The earliest rock art site from Chotanagpur plateau, now forming the state of Jharkhand, was reported for the first time as early as 1923 (Mitra 1923: 22). In the adjoining region of this plateau region, i.e. Orissa especially from the districts of Sambalpur, Kalahandi, Sundargarh, Jharsuguda and Mayurbhanj, a large number of rock art sites have come to light. From south Bihar rock art have been found from Nawada, Gaya, Kaimur, etc. In recent years a number of discovery from Jharkhand have been made and reported (Neumayer 1995: 80-83, Prasad *et al*) 2004: 68-81, Raut Dey 2004 a : 55-58). The present study was carried out in the northeastern part of the Chotanagpur plateau (lat. 23.5°N to 24.4°N, long. 85.1°E to 85.9°E and average altitude 611 meters), which covers the present districts of Hazaribagh and Chatra. Hazaribagh district is situated at the center of the Chotanagpur plateau, while Chatra district forms the northeastern part of Chotanagpur plateau. Exploration of the area was carried between 2002-2005 by a team including the present author. A number of rock art sites namely Isco, Nautangwa I, Thethangi, Saraiya were visited and one, named as Nautangwa II, was discovered (Raut Dey 2004b: 88). The present paper describes one of the different types of representation found on these rock shelters, i.e., animal. They are beautifully painted either in outline or silhouette and display dynamic moods of the beasts. Most frequently occurred animal in these rock walls is, deer followed by frog. Besides that goat, bull, rhino, etc., are also found. In comparison to the human representation animal paintings are very large beautiful and proportionate.

Isco

The Isco rock art site is near village Isco, in Barkagaon block of Hazaribagh district. It is situated about 45 km south west of Hazaribagh town. This hooded rock walls perhaps selected for painting activity by the artists among the other rocky outcrops of the area as this extended canopy protects the paintings from water. A dried up gorge runs just below the rock shelter. Both floral and faunal food, water and a natural roofed rock might have allured the prehistoric population to make at least temporary camp, if not permanent, here. Prehistoric habitation in this area is further proved by the discovery of lower palaeolithic tools from surface. A large face of the rock is covered with innumerable forms starting about six feet above the ground and continued up to the roof of the rock shelter. The painting in red and white are fading out day by day.

On Isco rock canvas an interesting medley of animals have been found, though they are not very large in their execution. Most of the animals are represented in a very dynamic mood.

A very perfect painting of an animal includes a jumping deer figure (Plate 1). This comparatively large painting is superimposed by other small paintings. This monochrome outline painting shows a bulky hind portion and the raised foreleg reveals a jumping stance. This outline painting of the animal indicates sufficient artistic skill of the painter to depict such dynamism in a single line.

An excellent painting of a charging bison is a remarkable art piece of Isco rock (Plate 2). This monochrome painting in red, beautifully depicts the expression of anger in its half bent foreleg and swelling body mass.

Another meek deer figure is found in the lower part of the rock. Its body is very proportionate and slender but the legs have much faded.

A rhinoceros in white outline is painted in some isolation from the jumble of paintings. This painting is also much washed out. The leg portion is fully obliterated; in the upper portion, the horns and ears are shown.

Upper outline of a boar is found in bichrome red and white outline. The lower part is totally lost due to flaking off, of the surface.

A meandering snake is painted in white outline and red in filling, in the lower part of the painted panel.

Another spotted deer is painted in white outline and red in filling. The head is faded. The entire body is shown as raised by the support of the hind leg (Plate 3). A mentionable feature of this painting is that a wheel like object is found attached in front of the hind legs, which reminds the famous painting of Chauvate, France.

Nautangwa I

The Nautangwa hill is situated about 55 km. south west of Hazaribagh town, in Keridari P.S. Nearest village of this hill is Sulga. It is in the Mahudi hill range.

The entire trekking route is full of trees and a rivulet runs within the hills. Thus the prevailing ecology indicates both water and forest resources were there, to sustain ancient people and settle in this area. Two painted rock shelters have been found in this hill and named as Nautangwa I and Nautangwa II.

The rock wall of Nautangwa I is the best in terms of preservation of the most beautiful paintings of animals so far found from the present study area. Animal figures are painted in monochrome red mostly.

One animal depicts a goat. This outline painting in red expresses its calm disposition. This painting is superimposed by another painting.

Another outline painting of cattle in red pigment is very prominently placed on the rock (Plate 4). This painting shows very accurate curved horns and mouth.

A humped animal painted in two red outlines and white filling (Plate 5). It shows a meticulous creation in its slender and elongated body, beautiful horns and a well-formed hump.

A painting of a pig is found in red outline. This much proportionate painting has lost its front legs. The hind legs of the animal are also not anatomically precise. This animal is portrayed as a pray before two hunters.

Another large animal in fine red and white outline depicts a jackal like beast. It has a very short tail and large ears.

A running deer is found painted in red outline. Among its forwardly bent legs front leg is smaller than the hind legs. Two lines demarcate trunk of this animal. A circular design has been made on it.

Just behind the aforesaid painting a beautiful painting of a spotted deer have been found. This animal is portrayed as a pray before a hunter. This red painting shows an elongated body and neck.

Another much faded deer figure in red, shows a short tail, hanging face and small horns. A square symbol is painted on the back portion of its body.

A large frog is painted in red outline and filling is done with white. This extra ordinary large representation might depict some special (religious?) significance of this animal in the life of those ancient folks.

Nautangwa II

This rock shelter provides a very difficult access. Most of the paintings of this rock face are obliterated due to the absence of any hood like extension. A number of post

wholes are found on rock floor of the shelter.

Most prominent animal painting of this rock shelter is a flock of deer (Plate 6) as if marching slowly towards a single direction. This outline painting in white painted in a manner as if the group is gently entering in to the jungle. The distance is expressed through the gradual diminishing size of the animals. These three deer painted in white outline is very accurate in proportion as well as technique.

This flock of deers superimposes a big cat like animal painted in red.

Another single deer figure in silhouette is found painted in red and white. It is painted slightly oblique to impart dynamism to it.

Rear portion of another deer could be visible on this rock. Only the neck and head portion is painted in a style to give the effect of as if emerging from a jungle or bush and rest of the body is still hidden in the darkness of the jungle. It is painted in red only.

Thethangi

The Thethangi rock shelter is situated in the Satpahar range of Chatra district. It is about 75 km southwest from Hazaribagh town. The sandstone rock surface of Thethangi is much damaged due to rainwater percolation. Many paintings have been washed out in this process. On the rock floor, postholes have been found.

Most notable rock painting of animal of this rock wall is of a bull (Plate 7). The animal is painted somewhat obliquely to give the effect of jumping posture. The angular face of the animal is painted only in red, while the trunk is painted in red and white.

Another small but similar bullhead is found just behind the side of the full figured bull.

A partially survived, long spotted deer figure shows an extraordinary long body. Only the trunk is found which is painted in red and covered with red spots.

A notable feature of Thethangi rock painting is the occurrence of good size frogs in large numbers. All of them are painted in red pigment. All has a triangular head, rectangular body, exaggerated sex organ and four legs spreaded lineally from the body.

A flock of animal is very beautifully painted in white. This deer band is moving in single direction and a hunter is aiming at them with a bow.

Another much faded deer head, in red could be found as superimposed by a symbolical representation in more bright red.

Another schematic outline painting of a deer is also evident on Thethangi rock wall.

Saraiya

It is also situated in the same Satpahar range opposite face of the Thethangi rock shelter. The painted rock surface is on the edge of the Satpahar range and thus very difficult to reach. This rock surface is much uneven for drawing.



Fig. 1: Rock-art sites of Chatra and Hazaribagh districts, Jharkhand

Here main theme of the painter is small animals. No human figure is found on the painted panels. In the painting of Saraiya only different shades of ochre colour is used.

One identifiable four-legged bovine is found as grazing a tree.

Body of an animal filled with cross pattern is another animal representation on Saraiya rock wall but its head or legs are not visible.

A small bird on a tree branch is worth mentionable as bird is very rarely depicted in rock art in world as well as in Indian context.

Conclusion

So it could be surmised that although Chotanagpur caters a wide variety of animals in both past and present, but only a few of them found its place in the rock canvas of this region. It is found that deer is the most preferred animal for rock painting of this region. Single or flocks of deer are painted in different actions like running, jumping, standing or moving together. Besides that bull, goat, pig, rhino, bison, cat, wolf, frog etc. are also depicted. Some animals are quite elaborate and large in representation. A mentionable feature of this painting is the portrayal of frog.

This small animal has got special treatment in its magnified size. It seems this animal might have been focus of worship of the ancient hunter-gatherer population. The painting clearly displays familiarity of the artist with these animals. That might also be the reason of portrayal of non aggressive animals on these rock walls. No pottery design or inscription has been found with these paintings which suggest the date of these paintings must be of pre pottery and pre literate time. Tools starting right from Paleolithic onwards have been evidenced from surface collection of this area. No painting could suggest the knowledge of agriculture while hunting gathering way of life is very well depicted. Again hunting with simple bow only, supports sufficient antiquity of the paintings. The rudimentary form of painting, only in combination of lines also tells the beginning phase of art activity. All facts very well indicate a date of sufficient antiquity. On stylistic ground also, these rock painting closely resemble those found from Orissa, which has been assigned a mesolithic date (Pradhan 2001: 115). Neumayer (Neumayer 1994-95: 83) also holds similar view of mesolithic date for these rock art. Based on Wakankar's (Wakankar 1976) classification also these paintings could be assigned a date from period I (mesolithic) to period II (neolithic).

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Mukta Raut Dey

New Copper Hoards from Rajasthan

A large number of copper objects, either in caches or as solitary finds, have been discovered from different parts of Rajasthan. Some of the important sites are Ganeshwar (distt. Sikar), Chithwari (distt. Jaipur), Medh (distt. Jaipur), Nandalalpura (distt. Jaipur), Karera Bujarg and Sakatapura (distt. Tonk), Kota Maholi (distt. Sawai Madhopur), Mallaha (distt. Bharatpur), Balambasai (distt. Alwar) and Dantia (distt. Alwar), which lie south and southeast of the Khetri-Singhana copper belt within 200 km radius. The present paper discusses two newly found such caches from Dantia (dist. Alwar), located to the southeast of Alwar city and Sakatapura (dist. Tonk) in the northeast direction from Tonk district headquarters.

Dantia Copper Hoard

Dantia lies in the vicinity of the Kho-Dariba Copper mines, hardly 40 km west to it. The copper hoard was found in the year 1999, inside an earthen pot in an agricultural field. The find spot ($76^{\circ} 57' 762''$ E; $27^{\circ} 12' 078''$ N) is 2 km north of Dantia village. The area also revealed some scarcely scattered rolled potsherds of red colour, on the surface. The hoard is presently kept under the aegis of Kherli Police Station, 7 km east of Dantia village. It comprises of a variety of copper objects (Pl. 1&2), viz. 5 bar celts, one flat celt (half broken), one chisel, a nail and a variety of copper bangles or rings (total 25) which may be subdivided into four groups based on their size, thickness and weight (Table 1).

Almost half a dozen copper hoard sites in Rajasthan exhibit bar celts in their collection. These bar celts although

identical in shapes, may be classified into two major groups based on their weights and lengths. The first category is of those celts whose length varies between 20 to 28 cm and weight between 1000 to 2000 grams and come from Nandalalpura (Agrawala & Vijay Kumar 1993: 125-134), Bhandar (Dhaka 2002-2003: 127-130) and Sakatapura.

The bar celts of second category are comparatively smaller in size with length approximately around 20 cm and weight close to 500 grams and seen at Varman (Dhaka 2002), Dantia, Kota Maholi (Agrawala 1980), Mallaha (*The Researcher*: 1996-97).

One significant feature, which imparts speciality to Dantia and Sakatapura bar celts, is the round indentation marks which were also found on flat Ganeshwar celts. This marking is the most popular one which had been observed on copper celts found from different parts of the country like U.P., M.P., Maharashtra, etc (Agrawala & Vijay Kumar 1993).

Only two bar celts from Dantia are marked with two circular dots or indentation marks in different alignment, near the butt end. The bar celts of this hoard are rectangular in shape with squarish butt ends, splayed out sides, lenticular sections and convex working or cutting edge. The working edge bears impression of constant hammering and sharpening to make it a viable tool for cutting, digging, etc. One of the bar celts, which is comparatively small, seems to be broken from top, i.e., the butt end but later reshaped. All bar celts are well preserved except one, which is highly impure, crude with lot of pores and broken into

two pieces that refit. Besides, a single and incomplete flat celt with convex working edge, a multi-faceted copper chisel and a nail with flat head, clearly indicating hammering marks are other noticeable tools. Variety of copper bangles in a single hoard is interesting, too. This hoard is, thus, first of its kind from Alwar District, known so far.

Sakatapura Copper Hoard

It was found lying loose in the soil, almost four feet below the surface while digging the grazing land during famine relief programme, last year. The find spot is nearly 1 km NE of Sakatapura village, located almost hundred feet away from the eastern field boundary of one, Jayaram Meena, not far from Newai in District Tonk of Rajasthan. As a mark of habitation, some rolled micaceous pottery, including some rim sherds were noticed in the vicinity of the find spot. According to local information, potsherds

do appear while ploughing. The hoard was acquired by Mustafa Baig of Baroni Police Station on 29. 3. 2003 and presently kept under its protection.

The Sakatapura copper hoard comprises of a total of ten copper objects (Pl.3&4) of which six are bar celts, three flat celts and crowbar or lever which is in two fragments that refit. Out of six bar celts, five are branded with circular or round indentation marks in groups of two, three and four, near the butt end. The last one seems to have faint marks near the butt end, which appear smudgy at preliminary examination. The bar celts are in good state of preservation. They are rectangular in shape with squarish butt ends, slightly splayed out sides and convex working edge.

There are three flat celts in this hoard, which bear close affinity, in size and weight, with Ganeshwar celts. Thus, the Sakatapura hoard may be presumed to be



Fig. 1: Distribution of copper hoard/object sites in Rajasthan

contemporaneous with Ganeshwar culture on relative grounds and first of its kind from Tonk District of Rajasthan. One of the cells has two dots as indentation marks near the butt end where as the butt part of one cell is missing. They are broad, lengthy and have defined convex - shaped working edge. Besides, there is a crowbar or lever, which is interestingly marked with three circular dots as indentation marks near the butt end. The butt has a flat face due to constant hammering and the sides taper to form a convex working edge. This tool was probably used as a lever or wedge (Table 2) for quarrying, splitting, breaking, etc.

Dantia and Sakatapura hoards add a new chapter to the archaeology of Alwar and Tonk districts. These are an

important addition to Jaipur District with Alwar being on one side and Tonk on the other. Spectroscopic analyses of these artefacts are further awaited in support of their chronology.

In conclusion, a considerable number of sites in Rajasthan have yielded copper objects, though; all of them may not be incorporated into the Copper Hoard culture. It is important to note that tool typology of the Gangetic Valley is quite different from that of Rajasthan. However, availability of harpoons at Medh and Mallaha in Rajasthan, which is characteristic of the Gangetic Valley, do send positive vibrations for some kind of connectivity and needs further probe after extensive explorations.

- | | | |
|-----------------------------------|---------------------------------------|-----------------------------------------|
| 1. KALIBANGAN (Dist. Hanumangarh) | 11. BALATHAL (Dist. Udaipur) | 21. ELANA (Dist. Jalor) |
| 2. GANESHWAR (Dist. Sikar) | 12. OHHYANA (Dist. Bhilwara) | 22. MAVLI DANGIYAN (Dist. Udaipur) |
| 3. DANTIA (Dist. Alwar) | 13. NAMANA (Dist. Bundi) | 23. NANDALALPURA (Dist. Jaipur) |
| 4. BHANDAR (Dist. Pali) | 14. BALAMBASAI (Dist. Alwar) | 24. KARERA BEJARG (Dist. Tonk) |
| 5. VARMAN (Dist. Sirohi) | 15. SABANIA (Dist. Bikaner) | 25. SAKATAPURA (Dist. Tonk) |
| 6. GILUND (Dist. Rajasamand) | 16. EKALSINGHA (Dist. Ajmer) | 26. JORPURA (Dist. Jaipur) |
| 7. BAGOR (Dist. Bhilwara) | 17. MALLAHA (Dist. Bharnipur) | 27. KOTA MAHOLI (Dist. Karnali) |
| 8. CHHAPARI (Dist. Nagaur) | 18. CHETHWARI (Dist. Jaipur) | 28. POOGAL (Dist. Bikaner) |
| 9. KURADA (Dist. Nagaur) | 19. MEDH (Dist. Jaipur) | 29. TARKHANWALA DERA (Dist. Gangargarh) |
| 10. AHAR (Dist. Udaipur) | 20. PIND PADALIYA (Dist. Chittorgarh) | |

S. No	fig. no.	Length (In Cm.)	Butt End Centre WorkingEnd			Butt End Centre		Weight (In Gm.)	Indentation marks
1.	Fig. No. 2; Bar Celts	21	3.8	4.8	5.8	0.38	0.47	434	..
2.	"	19.9	4.2	4.9	6.2	0.22	0.44	336	-
3.	"	18.5	3.8	4.85	6.2	0.28	0.45	370	..
4.	"	13.15	4.6	5.2	6.2	0.45	0.43	262	-
5.	"	18.4	3.5	4.55	5.45	0.31	0.59	374	-
6.	Fig. No. 2; Flat Celt	9.9	-	10.8	12.6	-	0.43	670	-
7.	Fig. no. 3; Chisel	19.15	-	-	-	0.51	0.61	54	-
8.	Fig. no. 3; Nail	10.2	1.65	1.62	1.28	1.10	1.10	120	-

Copper Bangles

S. No.	Fig. No.	Diameter(Internal, In Cm)	Thickness(In Cm)	Weight(In Cm)
9.	Fig. No. 3; Group No. 1	5.09-5.47	0.72-0.76	62-68
10.	Fig. No. 3; Group No. 2	4.6-5.6	0.5-0.6	28-34
11.	Fig. No. 3; Group No. 3	4.5-5.1	0.4-0.5	18-24
12.	Fig. No. 3; Group No. 4	4.1-5.3	0.3-0.4	8-20

Table 2: Details of Copper Objects, Sakatapura Hoard

			Breadth(In Cm.)			Thickness(In Cm)			
S. No	fig. no.	Length (In Cm.)	Butt End Centre			Butt End Centre		Weight (In Gm.)	Indentation marks
1.	Fig. 00, 4; Bar Celt	23.7	4.5	5.1	5.7	0.77	1.57	1330	***
2.	"	25.1	4.9	5.7	6.2	0.95	1.78	1800	**
3.	"	22.7	5.1	5.6	5.8	0.82	1.42	1405	***
4.	"	20.3	4.7	5.3	5.7	0.75	1.32	1014	***
5.	"	21.6	3.5	4.1	4.3	0.31	0.61	374	**
6.	"	20.6	4	5.3	5.3	0.82	1.61	1198	Not so Clear
7.	Fig. no. 5; Flat Celt	25.9	7	7.9	7.9	0.65	0.73	1227	**
8.	"	26.3	8.1	9.3	9.5	0.87	1.09	1693	.
9.	"	21.5	-	8.2	7.8	-	1.08	1540	.
10.	"	32.5	4	3.6	2.9	1.08	1.39	1011	***

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Application of Remote Sensing in Archaeology with Special Reference to Study of Palaeochannels of River Varuna in Varanasi District, Uttar Pradesh

Archaeological researches today are heavily dependent on scientific knowledge. Application of emerging scientific methods in the fields of Physics, Geophysics, Chemistry, etc., are applied commonly in Archaeology for a better understanding and a more precise interpretation of data. Lately, with the emergence of remote sensing, new horizons have opened for archaeological investigations. It is a fast growing and ever-expanding field of space research which is constantly improving upon itself. The higher resolution and magnification is extremely useful in recognising the patterns and changes on earth's surface. Viewed from a height of several kilometres away from the earth, it gives a panoramic view of a large expanse indicating features that makes things easily definable. It is a great asset to those working in the field of earth sciences, environment, landscape and agriculture, geography and archaeology. In the field of archaeology particularly in India, it is a new area, the potentials of which are yet to be fully exploited.

The earth sciences all over the world are benefiting immensely from remote sensing. Fields like geology and geography are closely interlinked with archaeology. Archaeology has borrowed several basic precepts from these areas. Any innovation in these disciplines, is therefore, bound to influence the archaeological interpretations. This is truer in those specific areas which still have links with such disciplines (Elbert 1984:293-361).

Palaeochannels are important in understanding the human past. Remote sensing has been extremely useful in defining the Palaeochannels that are being studied both by

the disciplines of geography and geology and also by archaeology. This is very much applicable to the drainage pattern that focuses itself on the Palaeochannels at different stages indicating changes in drainage pattern and the related changes in the cultural pattern and human behaviour. It is possible to define the age and nature of changes in human settlements at different stages as revealed by archaeological excavations or explorations. Thus, the interaction and benefit to these fields is mutual.

Study of Palaeochannel of River Varuna in Varanasi District

Varuna, an important tributary of River Ganga near Varanasi has a unique position amongst the tributaries of Ganga. The famous city of Varanasi, said to be the cultural capital of India, perhaps got its name after River Varuna, also referred to as Barna in the Vedic text (Atharvaveda). The mythological city of Varanasi (modern Varanasi) has its boundaries demarcated by the rivers Varuna and Assi (Chand 1985). Thus, Varuna assumes great significance in history and life of the city of Varanasi. For centuries Varanasi has been known as the centre of knowledge and learning of different religio-spiritual thoughts. Buddha gave his first sermon here at Sarnath, the famous Buddhist pilgrimage today. Although it is believed that Sarnath is located on a *nala* known as Narokhar Nala, the remote sensing map (Fig.1), however, shows it to be on the palaeochannel of Varuna itself. One needs to work on this further to confirm a link of this palaeochannel with Varuna. In any case seeing the meandering nature of River Varuna

there exists a strong possibility of the site of Sarnath being located on a channel of the river.

The Varuna rises from Tal Jigna (Phulpur, in District Allahabad) and flowing through newly formed District Sant Ravi Das Nagar (Bhadohi) it enters District Varanasi and meets the Ganga between famous archaeological sites of Rajghat and Sarai-Mohana. We propose to take a closer look at the behaviour and nature of River Varuna in Varanasi here.

Varuna flows with curves and meanders on the northern side of the city of the Varanasi joining the Ganga at Rajghat, that is believed to be the site of the ancient Varanasi. Varuna enters the modern district of Varanasi between Haribhanpur and Dhaunkiganj Bazar, crossing the newly formed district of Sant Ravi Das Nagar (Bhadohi). A large number of meanders of varying sizes are easily traceable on the map. A large number of such meanders are plotted by remote sensing indicating the changes that took place in the course of the river at different ages. Interestingly, it is possible to locate several ancient settlements close to the palaeochannels indicated on the Hydrogeomorphological map on the basis of remote sensing. On the basis of these mounds which are fast disappearing, many a times, it is possible to date the changes in river-courses.

The meanders close to the present course of River Varuna may be located at villages Saktanpur, Gogwa, Newada, Lachhipur, Rakhi, etc. On the southern portion, there is a noticeably large meander located between the villages of Gaddupur and Newada. There is also an open scrub. Further east on the northern side there is another meander between the villages of Karanun (Rameshwar) and Pandepur. There is a famous temple at Rameshwar, which is an important landmark of Panchkroshi. From this point the river adopt a southwards course till it reaches Bhatsar. It flows towards east with a south-east flow forming a huge curve or meander from Tandia to Imliaghat. From here it flows eastwards taking a curve at Nadesar before its confluence with Ganga at Sarai-Mohana. From village Rasulgarh the river takes a steep southward bend rising upwards before falling down into the Ganga at Adi

Keshaw Ghat. This point of confluence of Ganga and Varuna does not seem to have changed since at least 800 BC, as there are two sites of importance on both the sides of river, i.e., Rajghat and Sarai-Mohana.

A close look at the map of the area reveals palaeochannels that have been reutilized subsequently in the forms of canals. A sample of this feature may be the Adalpura pump canal passing by the villages Lallapur, Atrasua, Maghepur and Chakarpanpur. Similarly, there is a palaeochannel near the villages of Shambhupur and Basant which passes close to the Matika Nala. It may be close to the Varanasi-Bhadohi railway route. A small palaeochannel is visible near Dafarpur and Kanchanpur. On the southern side of Varuna there are three palaeochannels. These broken palaeochannels if joined together make a parallel stream with the present course of Varuna. One cannot rule out the possibility of this being the ancient course of the river. The villages of Kashipur, Kotwa and the surrounding area, were explored by us. We could locate mounds at Loharapur and Kotwa. The details of which are given below. The other two palaeochannels in this sequence running between Parjanpur to Bharthara and Patia to Birdapur could not be explored for ancient settlements.

On the northern side (left bank of River Varuna) there are signs of major changes in the course of the river. There are two parallel palaeochannels, one starting from the district boundaries of Jaunpur and Varanasi. It enters Varanasi District at the village Lachhirampur and is traceable upto village Basni (near Babatpur), which yielded a large number of Kushana coins, stone sculptures, etc. (Aq 1998). Another channel of the river is plotted on the survey map from Bhatauli to Amarputti and Chandapur. There are a large number of ancient sites on these palaeochannels-Pindari, Basni, Aharak, Shankapur, Mirdaha Bazar, Piari, Sarnath, Hiramampur, Akhata, Khajuri, Asapur, Tilamanpur, Konchi, Jalhupur and Kamauli (from west to east), antiquity of many of these sites goes back to 1000 BC. Many of these sites have been briefly excavated (Jayaswal 1998).

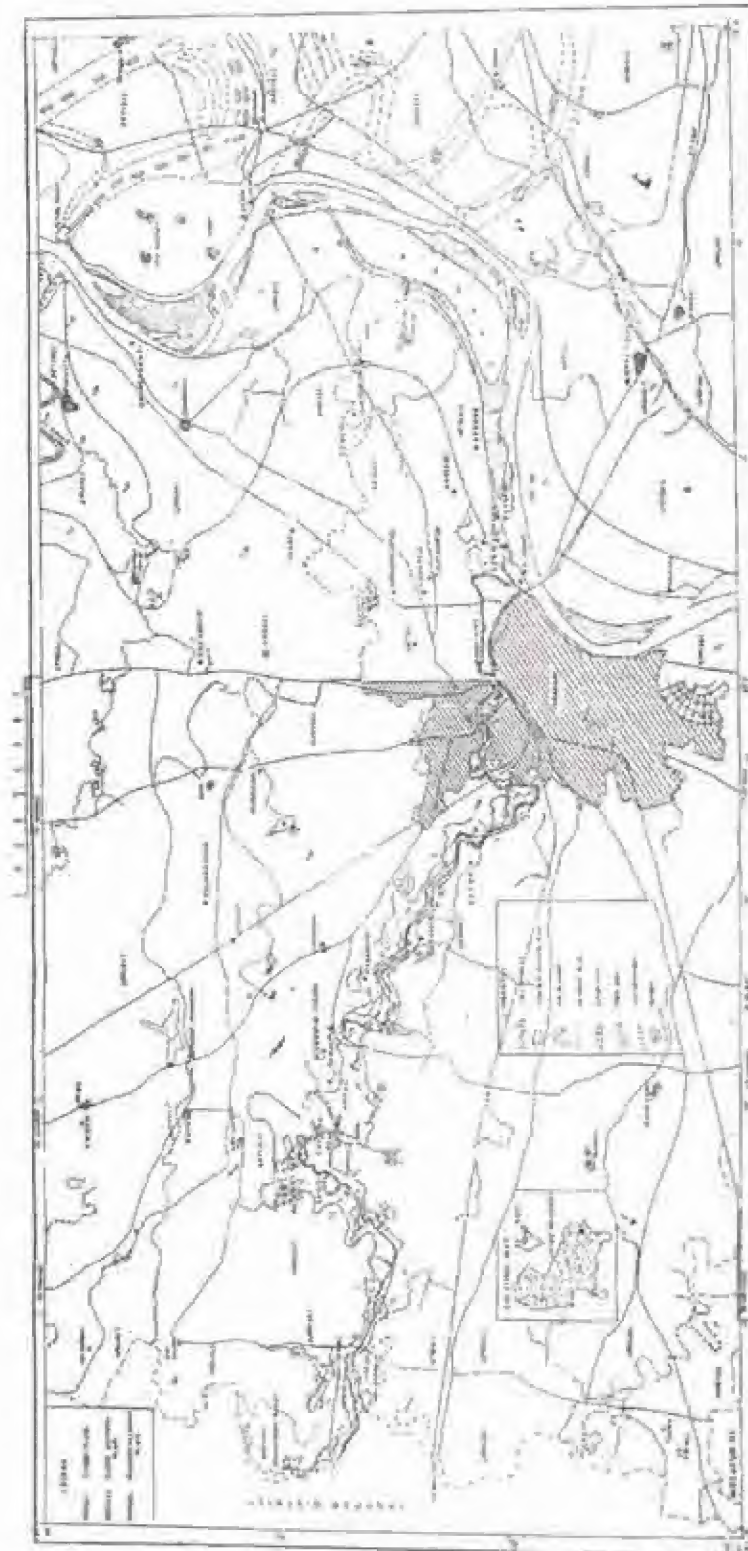


Fig. 1: Hydrogeomorphological map of River Varuna, Dist. Varanasi

There is a stream or *nala* that joins Ganga near Rajapur. Soil was collected for analysis from Kotwa, Asapur and Hiranpur. The soil analysis indicates that it is formed "as a result of regular process of dry and wet condition in the form of annual cycle a regular and periodical contact of water, in the form of rain water and annual flooding is thus indicated in these localities" (Jayaswal 1998:116). It is evident from the archaeological observations as well as the analysis of soil that floods in Ganga affected the locality specially lying close to the *nalas*. However, it is difficult to agree with the suggestion that the Akhata Nala/Narokhar Nala joined the Rajapur Nala beyond Sarnath. As indicated in the survey map Akhata Nala referred to as Narokhar Nala in Survey of India map rises somewhere near the Sarangnath temple flowing through the Dhameka stupa site and joins the Varuna near Kajakpura bridge. On the contrary, the evidence of remote sensing clearly shows a palaeochannel near Khajuri and Sarai-Mugal taking a northward curve and then coming down and flowing by the present site of Sarnath and further ahead upto Jalhupur. The most important major change is the one that indicates that the ancient Buddhist site of Sarnath must have been originally located on River Varuna. There are three major meanders

indicating the changes. The most important of these is the one that is present from Khajuri (25° 30' 24"N and 82° 45' 52"E) to Jaluhupur touching Sarnath on its eastward course.

Today the site of Sarnath is said to be located on Narokhar Nala, a small *nala* of little significance. This does not seem to be a likely fact in view of the significance of Sarnath which was chosen for the first sermon on *Dhamma* by the Buddha after his enlightenment. Besides being a pilgrim centre of Buddhism in the subsequent centuries, Sarnath also made debut in the field of art style where kings and devotees, merchants and artisans, chose to pay a visit. In view of these facts, the probability of Sarnath being located on Varuna is quite likely. In course of time, this channel of Varuna dried up leaving behind its trace in the form of *nalas* that may be traced in this area. There are at least five small *nalas* or streams between Rajghat and Kukuraha. Besides these, there are palaeochannels visible near the confluence of Varuna and Ganga.

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Understanding the Post-depositional Bone Modification Processes: An Actualistic Approach

Site formation process is a complex phenomenon, and undoubtedly involves the entire history of an archaeological deposit. The archaeological assemblages comprise the discarded remains of animals used for multiple purposes such as for meat, milk, hide and labour. These remains are subject to changes even when the site is inhabited and thereafter. Post-depositional changes or the first-order changes experienced by bones till the time of excavation include (i) differential losses of more fragile skeletons, (ii) addition to the faunal assemblage due to the incorporation of bones of scavengers, carnivores, symbiotic animals, etc., and (iii) disturbances due to abiotic factors like wind, rain, loss of moisture, floods, earthquakes, sunlight, alternate freezing or thawing conditions, penetration of roots, burrowing of animals, percolation of water through sediments, climatic variations, sediments borne by wind, volcanic deposits, trampling, displacement due to slope, human earth-moving activities, etc.

In general, it has been a practice in the past to record the artefact assemblages and analyse those without considering or emphasising much on their physical context or behavioural set-up. Little or no attention was devoted to the socio-cultural or natural processes that have contributed to the making of the collections. Archaeozoological methods recognise the importance of the natural and cultural processes that affect the formation of the faunal assemblage in archaeological context. The cultural processes (e.g., butchering, burning, marrow extracting), natural factors (e.g., exposure to sunlight, transport by water) as well as non-human scavengers and predators (e.g., hyena, vultures, dogs and rats) leave their

distinctive signatures on the animal remains. By looking at all such signatures, it is possible to comment on various aspects of human-animal interaction. Understanding the nature of various factors is essential for interpreting the faunal remains at an archaeological site. The present research is, therefore, aimed at addressing this significant archaeological problem. The present research reported here is part of a proposed long-term research design involving experimental or actualistic investigations in various stratigraphic and sedimentological contexts, particularly relevant in Indian situation.

Previous Work

The importance of site formation processes in interpreting the faunal record has long been known (Binford 1981, Chattopadhyaya 1985, Badam 1994, Petraglia 1995, Badam and Sathe 1995, Badam 2002, and Joglekar 2006). A few studies done in this direction began at the Deccan College in the late 1980s. These include observing buffalo carcass disintegration in natural conditions (Paddayya 1987) and the study of bone dispersal by scavengers on a vacant plot inside Deccan College campus (Faculty and Students 1989). While working on collection of animal remains from the site of Padri in Bhavnagar District, Gujarat in 1991-92, Joglekar (unpublished) recorded observations on Nilgai carcass scattering and hyena behaviour. Near the site several Indian striped hyena dens were seen, most of the skeletal elements were found scattered all round the dens. These were systematically tracked over a period of one month. The marks left on various skeletal elements were studied and compared to those made by dogs. During

the same period, three Nilgai (*Boselaphus tragocamelus*) males were found dead near the village (electrocuted by accident). The scattering of the bones of these animals was observed. Dogs, hyenas and vultures were involved in the process. Bones left at the site after a month were collected and studied in detail.

Badam (2002) undertook carcass-scattering studies in various National Parks in South India on the model of similar studies carried out in Africa. His work showed how basic taphonomic studies are important for interpreting vertebrate faunal record. Panja (1995) undertook actualistic work on examining various processes involved in creation of the archaeological record of mobile people. She observed nomads in Western Maharashtra over a period and thoroughly examined patterns of food refuse and strategies in dealing with mobility and settlement. The concern about site formation processes and the formation of the archaeological record culminated in a national seminar held at Deccan College in 1999. Various dimensions of the issue of interpreting the archaeological record in the light of natural and human factors controlling the formation of the archaeological record in variety of cultural contexts were discussed in detail. It included a case study on animal remains as indicators of site formation process (Joglekar in press). Recently, David Tetso of Deccan College, Pune has conducted actualistic study on bone modifications by different carnivores and is using the results while studying animal remains from the Chalcolithic site of Balathal in Rajasthan (personal communication).

Thus, it is clear that attempts to do actualistic studies on formation of archaeo-faunal record are very few. A majority of the experimental taphonomic research has been done outside India, and therefore, resulting analogies cannot be directly used in Indian context. Since the site formation process, climate, and geology differ in India, the need to conduct more actualistic studies, particularly on the taphonomic processes acting on faunal assemblages is even greater. There is ample scope for such works scrutinising the interplay of natural and cultural components in the formation of the archaeozoological record so that future faunal analyses can incorporate findings of

taphonomic studies on more secure footing than it is now.

The Experiments and Observations

The primary aim of this research was to experimentally simulate a few select taphonomic processes. For this purpose a set of causal factors that are related to bone modifications were particularly chosen. The effects of these factors on fresh (used in the experimental work) bones were recorded and the changes at regular intervals were monitored. In this study two types of experiments were conducted – (a) field experiments to observe the effects of various physical factors, and (b) chewing/gnawing experiments to observe the teeth marks of scavengers.

(A) Field Experiments

Experimental taphonomy of modern bones was the central theme of this research. Hence, a methodology suitable to the aims and objectives was formulated in order to understand effects of various physical/natural conditions that are known to alter bones after these are deposited. Three domestic animal species that are commonly found in archaeological record – cattle, goat and pig were selected. The long bones, metapodia of these animals were procured from market and sets were made after initial identification. Any pathological and/or anomalous anatomical features were observed before these bones were used in the field experiment. Also the weight of these bones was recorded and they were marked using an oil paint.

On the predominant basis of proximity and convenience, three locations were chosen for field experiments, two of which were within the Deccan College campus (plain, flat open and unprotected land) and the third one on a hillock (Fig.3) near Dighi village to the north of Pune city (gentle slope of 0.179). Pre-formulated observation strategies were followed at all the locations and the observations were recorded. However, in this article only one such location (Location 2; Fig. 3) has been described as a case study. Reference points in each location were marked with a black cross on some immovable and conspicuous objects.

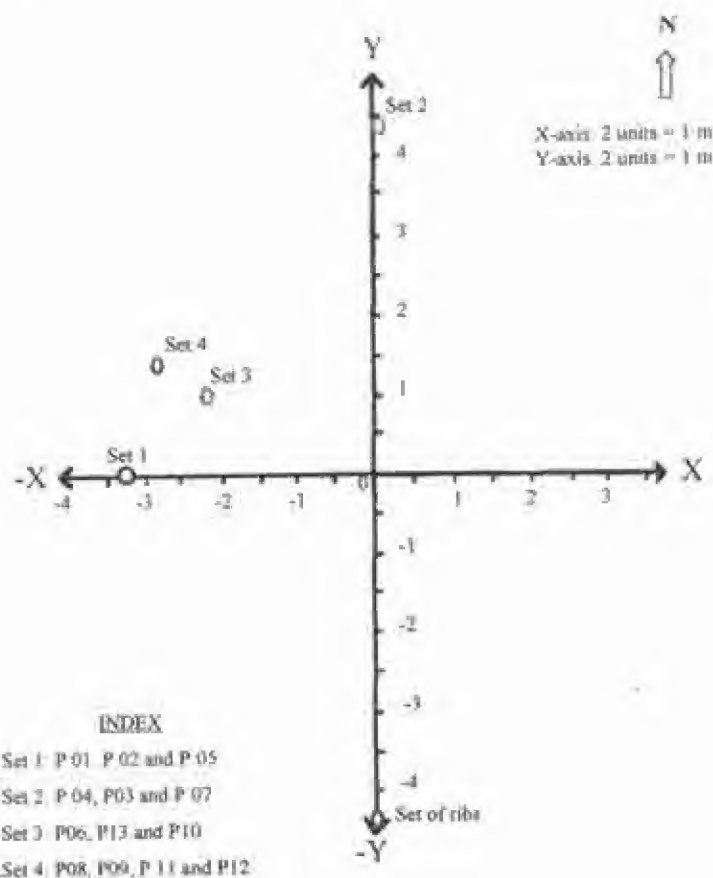


Fig. 1: Graph showing the positions of the bones at Location 2 during the first visit

INDEX

Set 1: P 01, P 02 and P 05
Set 2: P 04, P 03 and P 07
Set 3: P 06, P 13 and P 10
Set 4: P 08, P 09, P 11 and P 12

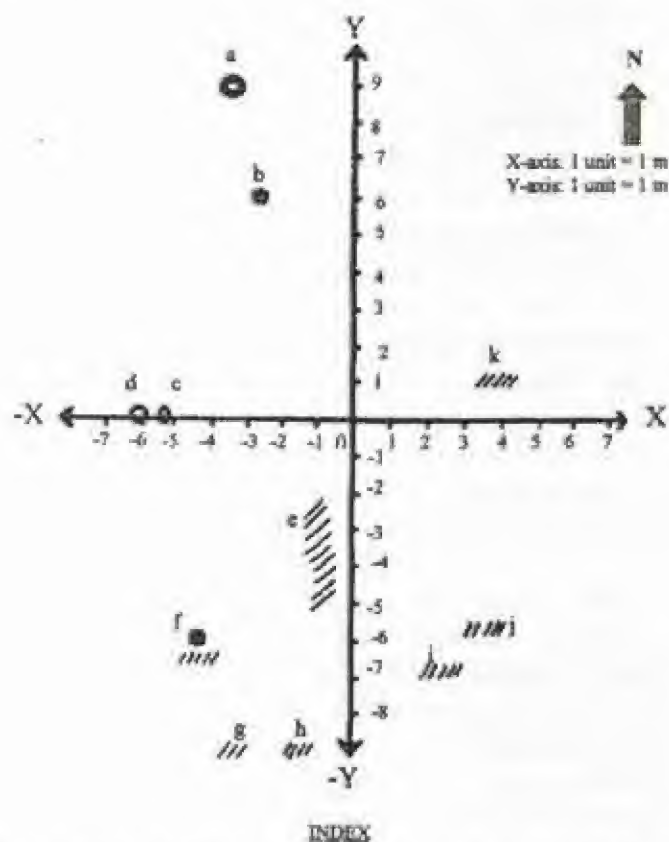


Fig. 2: Graph showing the positions of the bones at Location 2 during the final visit

a:	bone with paint mark	g:	cluster of ribs
b:	scapula	h:	bone fragments
c:	rib	i:	bone fragments
d:	tibia	j:	bone fragments
e:	cluster of ribs (in the depression)	k:	bone fragments
f:	scapula		

The marked bones were taken to the respective locations. They were then placed at different positions with respect to the reference points. Graphs indicating their spatial positions were prepared, and photographs of the locations in general and the bones in particular were taken.

Periodical recording was the key point in all the experiments. Each location was visited at regular intervals of one to two months during the weekends. During each visit, changes in the positions, pathological conditions and anatomical features of the bones were systematically recorded. Simultaneously, climatic, environmental and changes of any other nature were also recorded. Graphs were prepared and photographs were taken during each visit. After the final visit, the bones were collected in plastic bags, and brought back for further analysis in the laboratory.

Observations on Location 2: Location 2 ($18^{\circ}32'59.6''$ N; $73^{\circ}52'24.6''$ E; Elevation: 546 m AMSL), a thinly wooded area, is situated to the north behind the Deccan College Library and is covered with plenty of shrubs, herbs, grasses and planted trees. The soil has a pH value between 6 and 7, and the colour is 5YR 3/4—dark reddish brown. People, cyclists, and shepherds who herd buffaloes and cattle regularly use the *kachha* paths, which cut across the plot. Domestic pigs, dogs, cats, hare, and small animals like squirrels move around the place. Several ruins of early-nineteenth-century constructions are present in this area. One of these broken cemented platforms served as the reference point.

On August 30, 2005, 13 bones and one set of ribs of pig with plenty of flesh and blood were obtained and labelled as P01, P02, etc. (P for pig). A square (5 x 5 m) was marked in the northern direction with respect to the reference point. Four sets of bones were scattered on the surface randomly. The ribs were thrown in a small depression to the south of the reference point. Simultaneously their positions were plotted on the graph (Fig. 1-2).

The location could not be visited regularly till October due to heavy rainfall and thick growth of vegetation.

Occasionally, dogs and buffaloes were observed roaming around the location. A tibia and a broken pelvis were spotted. On 30th January 2006, during the 4th visit only four ribs and the tibia were spotted in the southwest quadrant amongst dried-up grasses and fallen leaves, which had camouflaged them. Photographs were taken *in situ*, and plotting of the bones was done (Fig. 3).

On 25th March 2006, during the final visit most of the bones were recovered from the southeast quadrant. The vegetation had completely dried up leaving a thick layer of humus on the surface. One damaged bone with a paint-mark on it was found in the northwest quadrant. Fragments of bones were strewn all over the place. Three of them could not be identified as that of a pig (specimen nos. 11, 23, 24), while the rest were positively identified as pig bones. It was observed that the skeletal remains had not been displaced much. Most of the bones were found only a few metres away from their initial positions. This could be due to the fact that this location had thick vegetation in the rainy and winter seasons and the bones were probably hidden by the vegetation. Also due to light human and vehicular movement, the recovered skeletal remains do not show much trampling marks. It is perhaps possible that due to the secluded nature of this location, the scavengers did not carry the bones to other areas but only moved them to small clearings within the periphery of the location, where they could chew on them.

The set of ribs of pig, which were thrown in a depression at the location were recovered totally from the area around the depression. However, they were disarticulated, decomposed and not heavily damaged. A probable explanation for this observation could be that the ribs, not being rich in flesh, were not attacked much by the scavengers. The ribs show very few gnawing marks, and only four ribs had trampling marks on them.

It was observed that several roots and rootlets had grown over the bones and got entangled with them. As a result, faint impressions of roots and rootlets were found on the astragalus and centrotarsal. The centrotarsal, magnum and scaphoid had no marks on them. The two

flat bones and long bones were identified as ribs. Humerus (proximal), femur (distal) and the left calcaneum had distinct gnawing marks. Insect remains were found on the patella and the tibia. Some of the bones like the femur and humerus were still green and not completely decomposed. The bones were otherwise completely dis-articulated with no flesh attached to them and comparatively dry. They had a yellowish tinge to them.

Changes that occur after deposition are called 'diagenesis'. The plants and animals disturb faunal remains from the early stage in the formation of the deposit when refuse is first discarded, continuing as long as the deposit is on the ground. The bones used for the experiments in Location 2 also underwent several diagenetic modifications, majority of which were caused by the scavengers. The types of teeth marks noticed on the bones include gnawing, pitting, gouging, chewing, puncturing, striations, etc., and do not show much trampling. Evidence of scavenging in these bones is greater (Fig. 3).

As none of the bone assemblages were found buried, they were exposed to the natural elements till their recovery. Such exposure could have hastened their decomposition resulting from the action of microbes and enzymes. Also the neutrality of the soil in terms of its pH in this location facilitated in the better preservation of the bones.

(B) Chewing/Gnawing Experiments

Various carnivores are known to be the major post-depositional bone modifiers due to their scavenging behaviour. In this study, it was decided to observe how dogs and cats act upon fresh bones and what kind of teeth marks do we find on the leftover bones.

In order to simulate chewing/gnawing behaviour that could have occurred on protohistoric and historic sites, experiments using two sets of fresh bones were conducted. The first set, which contained raw unmarked beef along with the bones, was given to two stray dogs in the Deccan College campus on August 4, 2005. The leftovers were

recovered after 24 hours and buried within the campus (near the administrative building). The second set comprised cooked chicken bones collected from the Sunday feast leftovers in the Students' mess of the Deccan College on September 6, 2005. They were fed to the cats living in the campus near the mess. After 24 hours, the bones were recovered and buried. The buried bones were dug up on March 25, 2006. They were photographed and analysed for teeth marks.

It was observed that dogs chewed and gnawed on the bones for a longer time, as they were raw. The cats, on the other hand, abandoned the bones after two hours, because they could easily remove the flesh on the cooked bones.

The number of fragments and splinters among the recovered specimens after eight months of burial were very few. Although chewing and gnawing by scavengers may produce splinters and fragments, they are usually swallowed along with the flesh and further modified or destroyed. Damage to the bones in the form of gnawing, chewing, pitting, scooping, puncturing, gouging, etc., were observed mostly on the ends of long bones due to which the proximal and the distal ends were detached. This is because the ends are softer, more porous and have more flesh on them. This kind of action would have facilitated the extraction of marrow. The experiments indicate that diaphyses are more likely to survive because of their bulk and higher density.

The shafts had longitudinal scratches and several marks on them. In archaeofaunal specimens too, such signatures created by carnivore teeth are present. But as the experiments on teeth marks revealed, it is difficult to distinguish between the teeth marks of dogs and cats. The marks when compared to those observed by Joglekar (unpublished observations) on bones scavenged by hyenas at Padri, made it clear that at macroscopic level it is hard to distinguish such marks. Moreover, it is also hard to differentiate between tooth scratches, nail scratches and abrasions caused by scavengers and the physical environment, respectively. The actions of wind and soil particles on the exposed surface of the bones leave similar scratches and patterns. However, in reality one may be



General view of Location 1



General view of Location 2



Recovered bones from Location 2



A set of ribs *in situ* at Location 2

Fig. 3

able to distinguish among different marks made by various scavengers. Since this was a pilot study, only dogs and cats were included in the experiment. A possible solution to such a problem would be micro-level and SEM studies to analyse the wear patterns on bones, which was beyond the scope of this work. Root etching and insect damage are non-human processes, but when specimens in the archaeological record showing the impact of these forces survive, they may help to distinguish between assemblages produced by humans and non-humans.

Discussion and Conclusion

The present research, which is experimental and actualistic in nature was made with the primary aim of understanding a few post-depositional bone modification processes (biotic and abiotic). It is obvious that these are long-term processes and affect the faunal assemblages from the time the bones are deposited till the time they are recovered from an archaeological context, sometimes over a period of thousands of years. Although such studies should be made for longer periods of time, the scope of the present research allowed these experiments to be conducted for a shorter duration, i.e., for 8 months only. However, the results obtained from these pilot experiments are significant as the specimens recovered after the completion of the study, showed extensive modifications and changes attributed to various taphonomic agents.

This short-term research has taken two different depositional contexts like flat, open, unprotected land and a sloping surface to analyse the behaviour of skeletal elements in such simulated set-ups. However, archaeofaunal remains are found and recovered from many other such contexts like deserts, rivers, caves, etc., where aeolian, fluvial and several other causal agents come into play to modify them. Therefore, studies in future need to be designed to assess the impact of such contexts on the movement and condition of bones after their deposition over a long period of time.

Several scavengers like hyenas, birds, rodents and micro-organisms leave signatures of their scavenging

marks on the food refuse. However, due to the limited time frame of the present research, only two carnivores – dogs and cats, were considered for studying the marks made by their scavenging activities. Therefore, further experiments and research designs need to be formulated to study the scavenging marks made by other scavengers such as hyenas and scavenging birds as well.

The archaeofaunal remains show tangible evidence of taphonomic changes, which occur in various permutations and combinations. This can be attested to by the results derived from the present work whereby within a span of 8 months, skeletal remains taken up for experimental study underwent changes caused by action of not just one or two, but several taphonomic processes. The presence or absence of a particular taphonomic change seen on a bone does not necessarily imply the presence or absence of the agent that caused the change. For instance, a specimen in an archaeofaunal assemblage from a site may not have gnawing marks on it, but that does not mean that scavengers were not present in the site. There could be some other types of signatures such as nail-marks or only punctures due to canine teeth. In other words, the causes and the effects of some taphonomic changes could be elusive in nature. In order to isolate a particular effect or effects attributable to a specific cause or causes, experimental taphonomic studies need to be designed with fewer controlled variables followed by a comprehensive analysis of their specific effect or effects. It is a primary necessity that one creates an information base of various bone modifications for the creation of a generalised model of behaviour related to faunal deposition. When many such studies of variable duration and considering a variety of contexts are conducted, such a model can be created. This present study is a beginning of the process of creating a general model or simulated past diet-related behaviour. For instance, a separate research designed to study the effects of trampling alone or the decomposition of bones due to the action of micro-organisms alone can throw light on specific taphonomic changes.

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Neolithic axe from South Kerala

During the recent archaeological exploration a stone axe of the Neolithic culture has been discovered from Vembayam in Trivandrum District in south Kerala. The tool was half buried in the hard matrix and it is, for the first time, that a Neolithic axe has been found from the district.

The implement is made on the locally available granite and the length, width, thickness of the tool is 16 cm, 8.5 cm and 3.8 cm, respectively. The tool has the maximum width near its convex working edge at the distal end while its greater thickness has been measured at the middle. Proximal end of the implement is pointed and it has bilateral symmetry. Use mark of the tool is seen at the convex working edge as striations at right angle and it has no damage (Pl. 1). This represents one of the important implements of the Neolithic culture in the last Stone Age phase which was existed between 4000-2000 BC.

In Kerala the first Neolithic evidence was discovered from Kannyakod Hill in 1891 by Philip Lake and later Fawcett had discovered similar evidence from Wyanad in 1901, all in north Kerala. Only after several decades such evidences were found from Attappady and Aluva. Later similar evidences were discovered by P. Rajendran in 1989 from Mantrothuruth in Kallada river basin of Kollam District and in 1995 from Kunmoni in south Poonjar of Kottayam District. As a sequel a Neolithic axe has now been discovered from Trivandrum District.

The occurrence of Neolithic cultural evidence and other early Stone Age finds from all the three physiographical zones in Kerala indicates the fact that the region had conducive environmental situation for the prehistoric habitation from the coast to the *ghats* on the south-west coast of India.

BOOK REVIEWS

Kanungo, Alok Kumar (Ed.) 2005 *Gurudakshina: Facets of Indian Archaeology – Essays Presented to Prof. V.N. Misra*, BAR International Series 1443, Hadrian Books, Oxford, UK, pp.VIII+345; Price not mentioned.

At last there is a volume felicitating a scholar like Prof. V.N. Misra whose leadership shaped the prehistoric researches in India during the last more than three decades. A keen student of Sanskrit language learning under the strict discipline of Pt. V.N. Shastri, a trained anthropologist exposed to the pioneering researches of Prof. D.N. Majumdar, an outstanding prehistorian doing rigorous field-work in the dry and hot deserts of Rajasthan under the hard taskmastership of Prof. H.D. Sankalia, working hand-in-hand with his colleagues like geologist Prof. S.N. Rajaguru and interacting with world's outstanding prehistorians like Grahame Clarke and J.D. Clark, contributing to the growth of Indo-Pacific prehistory with Prof. Peter Bellwood, editing the journal *Man & Environment* and raising its standards to world level, and excavating prehistoric sites like Tilwara, Bagor, Bhimbetaka and Didwana and protohistoric sites like

Balathal, Prof. Misra has been more equipped than anyone else to not only carry out the vision and legacy of Sankalia but also adding many new dimensions to the personality of Indian archaeology. In 35 years of his teaching career he guided as many as 25 Ph.D. Theses of scholars, most of whom are now occupying various academic positions in Indian Universities and Research Institutes. The regions, his research students covered, extended from south Kerala, through Andhra Pradesh, Orissa, Bengal, Rajasthan, Uttar Pradesh to Uttaranchal. The periods covered by them extended from Lower Stone Age, through Chalcolithic and Bronze Ages to Early Iron Age and well into the Historical Period. The range of subjects which he further developed in the Deccan College through his junior colleagues and which shaped the multidisciplinary approach of his research scholars extends from Tool Technology and Environmental Archaeology to Ethnoarchaeology, Archaeological Chemistry, Palaeontology, Palaeobotany, Zoology, application of Scientific Methodologies, etc. No wonder, during his Directorship the Deccan College was finally accorded the status of 'Deemed to be University' by the UGC.

Never before a publication of this kind was conceived, prepared and published in India. Although, like several others, it is also a Felicitation Volume presented to a distinguished scholar on his 70th birthday, originally designed for his 65th birthday, the entire format of this publication is different for which all credit goes to its editor, Dr. Alok K. Kanungo, one of the Ph.D. students in the Deccan College. He has proved that he can think differently, plan differently and also execute it. It is no mean achievement on the part of a young scholar. It contains not only the detailed bibliography and CV of Prof. Misra, but also the detailed illustrated summaries of the Ph.D. theses produced under the guidance of Prof. Misra, happily prepared by the research scholars themselves justifying the caption '*gurudakshina*'.

Thus, Shafiqul Alam reports the typological, technological, functional and stylistic variability among the Palaeolithic stone tool industries of Bhimbetka in central India on the basis of a detailed metrical analysis. Jacob Jayaraj and Abdul Munaf discuss the cultural evolution during the Palaeolithic and Mesolithic periods in the Tirupati valley, Andhra Pradesh in the context of topographical setting, drainage pattern, raw material and other resources, and use analogies of the subsistence strategies of the Yanadi hunter-gatherers and fishermen living in the same region. D.R. Raju's paper summarises his investigations of the rich Upper Palaeolithic sites located along permanent water pools in the Gumjana valley in Andhra Pradesh, and explains their location with the help of the use of the same water resources by the Yanadi hunter-gatherers and fishermen. Bishnupriya Basak examines the microlithic sites in the Tarafeni valley in north-west Midnapur in West Bengal and tells us about her ongoing work in the area which focuses on prehistoric land-use pattern. Kumar Akhilesh reviews the present status of the Upper Palaeolithic 'Damin' industries of the Banskoi river basin, Jharkhand on the basis of finds from his field work. V.R. Reddy reports his discoveries of a large number of Mesolithic, Neolithic, ashmound, and megalithic sites, and excavation of the ashmound at Palavoy in the semi-arid region of Andhra Pradesh. M.M.

Hoque's paper gives an account of the settlement patterns during the prehistoric and protohistoric periods in the Middle and Lower Ganga Valley in the context of landscape, soils, climate, water sources, flora and fauna. P.K. Thomas writes on the role of faunal remains in the reconstruction of the subsistence pattern of the Mesolithic and Chalcolithic communities of western India'.

'Shahida Ansari has attempted a reconstruction of the settlement and subsistence patterns during the Mesolithic-Chalcolithic periods in the south-central Ganga Valley on the basis of archaeological data collected by archaeologists of the Allahabad University and her own extensive field-work among the primitive communities of Kols, Musahars and Mallahs of the region. Tama Panda-Roy has attempted to trace the socio-cultural evolution in the area covered by the undivided coastal districts of Puri and Ganjam, and inland district of Sambalpur in Orissa on the basis of geographical, archaeological, historical, ethnographic, and linguistic data'.

'Katy Dalal's paper discusses the Early and Mature Harappan ceramics of the Ghaggar (Sarasvati) valley with special reference to the site of Birjor. J.S. Kharakwal summarizes the results of his discoveries of rock art, eist burials and archaeometallurgical sites in the Kumaun region of the Himalayas. Sunil Gupta writes on the historiographical framework of the early maritime trade in the Indian Ocean. He attempts to reconstruct, primarily from archaeological evidence, aspects of sea-borne trade between India and the Roman world. S.S.M. Rahman attempts a reconstruction of the cultural history and settlement patterns in the Bogra district, Bangladesh during the Early Historic and Early Medieval periods mainly on the basis of his own field-work'.

'Anup Mishra gives an account of the varied ceramics found in the Chalcolithic levels at Balathal, and discusses the changes through time. Kurush Dalal reports his study of the non-ceramic material remains, including two interesting terracotta sealings from Early Historic Balathal. According to him Balathal, located on a north-south trade

route, was a major centre of the production of iron objects and their trade. Abhijit Dandekar's paper attempts to understand the local traditions of pottery shapes and technology in the Early Historic period of Balathal in relation to surrounding regions. The works of those who worked under him but have not contributed to this volume remain unrepresented for obvious reasons.

Misraji has been most friendly and most considerate to practically everyone who came in his contact, including his students, but also most uncompromising in matters relating to academics. He stood fast to his views that human efforts in India as elsewhere always triumphed over the constraints of nature as opposed to the views of M.K. Dhavalikar who is a protagonist of the theory of 'climatic determinism of culture'. He opposed tooth and nail views of Gurdip Singh that climate fluctuation was responsible for the rise, growth and decay of the Harappan Civilization. On empirical grounds of archaeological findings, satellite imagery, geomorphology, radiocarbon dates as well as Vedic references, he, like Prof. B.B. Lal and the reviewer, demonstrated to the world of scholarship that like the Indus, the Saraswati also contributed, perhaps much more, to the growth of the Harappan Civilization from the Early Harappan stage through the Late Harappan stage, although some of his close associates kept on disagreeing with him for reasons other than the academics.

Unfortunately, not enough has been recorded in this volume about the efforts which Misraji made through his edits to shape the journal *Man & Environment* which the reviewer had personally financed, established, edited, published and released in the Jaipur conference of the IAS. That in future it will not be edited by me was clear to me from its first issue itself. I tried several hands to do the job but none succeeded; in the long run only Misraji was able to give the concrete shape to my dreams and desires. My home in Delhi became his second home, one suitcase of his clothes permanently remained in the guest-room till recently. How he raised the standards of the Indian prehistoric studies through this journal should also have been, in my opinion, recorded in details since it forms an

important part of Misraji's academic personality. How he roped in the Ford Foundation to finance its publication should also not go unnoticed.

The contribution of the editor, Dr. Kamungo himself, is very significant since it contains detailed and illustrated summaries of the entire range of field-work that Dr. Misra conducted in his long career. One can use them gainfully in his or her research-work even without going to the original articles which Misraji wrote on them. However, those who wish to consult them can now do that through an equally useful 'Annotated Bibliography of Prof. V.N. Misra's Research Publications (1962-2005)' prepared with great care and at the expense of hard-labour by one of his very bright young colleagues, Dr. P.P. Joglekar.

The third article "Situating V.N. Misra in Indian Archaeology: A Historiographical Account" by Prof. K.K. Basa is indeed a complete X-ray of the personality of V.N. Misra since it is aimed at evaluating the contributions of a scholar who took Indian Prehistoric Archaeology from the 20th century to the 21st century. Prof. Basa did it through his favourite discipline of Historiography, since only through this approach that one's academic contributions can really be judged. Basa has clearly shown through several quotations from the writings of Misraji and through the different approaches to Prehistory adopted by distinguished scholars of the Western world that Misraji was most modern, everready to adopt new approaches, new methodologies and new technologies to conduct research and understand not only human evolution but also cultural evolution, particularly in the Indian context. What is important to note in this essay is the fact that Misraji simply refused to apply those concepts which have little relevance to Indian archaeology. He has been quite clear in his mind that like anthropology, tradition and literature can never be ignored in Indian archaeology although in American archaeology it may not have any place for obvious historical reasons. Basa, of course, has also pointed out the failure of Indian Prehistorians to evolve theoretical propositions emerging out of their own experience in India. At the end, he sums up his discourse with the most pertinent

observation that 'Misra appears to be a secular nationalist' by which he perhaps means that the entire range of his writings and approaches have been free from the communal and Marxist biases; he has constantly been nationalist to the core.

In the opinion of the reviewer, this book should be treated as a text book on Indian archaeology and be possessed by everyone interested in Indian archeology in India as well as abroad.

S.P. Gupta

Dhavalikar, M.K., 2002 *Environment and Culture: A Historical Perspective*, Bhandarkar Oriental Research Institute, Pune, pp. x + 324, 40 figures, maps, line-drawings.

This book which is first of its kind in India on environment and its ramification on cultural development has seven chapters with appendix, bibliography and index. The aim of this study is based on the hypothesis of the deteriorating environment and the author has covered all the phases of Indian history and showed how monsoon is responsible to a great extent for shaping the ups and downs in our cultural process.

The chapter 1 deals with 'Cultural Ecology' which emphasises that environment is a fundamental factor in shaping human cultures and any shift in it from region to region makes changes in cultural equipment of man and culture, too. References were made about the works of H.D. Sankalia, S.N. Rajguru and D.P. Agarwal in reconstructing past environment but the study by Gurdeep Singh who conducted palynological studies from the lakes in Rajasthan was considered as most significant. The next chapter 2 'From Foraging to Farming' gives a survey of Stone Age cultures in India and the shift from food gathering to food production, i.e., the beginning of agriculture in the sub-continent. In this chapter the author

has also drawn a connection between Nile flood level data from 5000 BC to 700 AD and Indian Monsoon. This was also the time when the different cultures in Asia gave rise to urban civilization because of the migration of pastoralist into the great river valleys. The close of the 3rd millennium is marked by drastic climatic changes not only in India but in other parts of the old World. The author has also suggested at this stage that the Vedic Aryans were in all probability the late Harappans who lived during 2000-1400 BC which was a period of aridity. The next chapter belongs to 'Rural Economics' dealing with the remains of the neolithic and chalcolithic cultures starting from Kashmir Neolithic and then Central Ganga basin, Bihar, Bengal and Orissa. The south Indian Neolithic has been considered as an independent origin.

The chapter 5 deals with 'Age of Empires' appearing on Indian scene by the middle of the first millennium BC. This was also the time of the Persian and the Sassanian empires in West Asia, Hellenistic and Roman in Europe and the Han in China. This period is also marked as the emergence of the second urbanization and the beginning of the historical period.

The chapter 6 pertains to 'Second Deurbanization'. The following five or six centuries identified with degeneration and decay and urban centres were deserted because of turmoil in political field creating economic uncertainties. The lack of political suzerainty was the main reason. The last chapter is 'Medieval Misery' described by the author as the period of 'struggle between Muslim invaders and weak regional powers'.

The 'Appendix' shows the time span of excavated sites with their cultural phases from c. 3000 BC onward, region wise. These time charts are primarily based on 14 C dates and also on typological correlation.

The author has covered a time span of five thousand years and is of the view that environment was already deteriorating. The highlight of this book is Nile Flood level data from 5000 BC to 700 AD and its comparison with

India. All the chapters and appendix which are supported by illustrations, maps and line-drawings make this book really a useful handbook of information for students and researchers in archaeology.

K.N. Dikshit

Singh, B.P. and A.K. Singh, *Excavations at Sarai Mohana 1967-68 (A Satellite Settlement of Ancient Varanasi)*, Department of AIHC & Archaeology, B.H.U., Varanasi, pp.120, plates 33, Figures 32; Price not given.

The ancient site of Sarai Mohana is situated close to Rajghat, across the river Varana. The department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University decided to excavate the site after closing the work at Rajghat and a small scale excavation was carried out in 1967-68 under the direction of A.K. Narain assisted by T.N. Roy and the first author of the present excavation report. The main aim was to obtain the culture-sequence and work out the relationship, if any, with Rajghat besides imparting field training to the students.

In the light of new evidence coming from over one dozen sites in the middle Ganga Valley, the authors of the report have entirely revised the chronology and culture-sequence of the site from what was indicated by the excavators in the *Indian Archeology, 1967-68: A Review*. In brief, the earlier sequence was having two periods-Period I with three sub-periods-IA, IB and IC belonging to Pre-NBPW, NBPW and Late NBPW phases, and Period II assigned to late medieval period. The revised sequence has three periods Period I being Pre-NBPW period, Period II with two phases of early and late NBPW and period III being a deposit containing mixed remains of Kushan, Gupta and Medieval periods.

In view of the available carbon 14 dates from many sites in the middle Ganga Valley containing the similar

cultural contents as found in Period I at the site, the beginning of it has been assigned to *circa* 1300 B.C. continuing upto the introduction of NBPW. But comparing the material to Sohgauna and taking the C 14 date further earlier, it seems that the beginning of period I at Sarai Mohana could be placed around c.1400 B.C. and that of Period II somewhere in between 1000 to 900 B.C. on the analogy of earlier available dates of NBPW reported during recent years.

The significance of this excavation report of a site, adjoining the famous Rajghat site yielding the early remains of the city of Kasi or Varanasi, lies in the fact that the Period I identified by the authors at Sarai Mohana is the same as identified with the Period IA at Rajghat whose beginning is ascribed by the excavators of Rajghat to *circa* 800 B.C., but now on the basis of comparative excavated material from other sites with a number of C 14 dates available has been pushed back to *circa* 1300 B.C. by the authors suggesting the antiquity of Kasi to about the middle of the second millennium B.C. under the circumstances, it is quite evident that this is the high time when considerable thinking is required to ascertain the chronology of not only Rajghat, Akatha or Ramnagar but many of the city sites excavated earlier but having nil or insufficient scientific dates, particularly of the lower levels.

The book is a welcome addition to our knowledge of understanding the gradual rise and growth of the city of Kasi or Varanasi which was later traditionally continued in between Varana and Asi rivers in north and south respectively with Ganga on the east, but which grew from the habitations belonging to the Pre-NBPW cultures in the second millennium B.C., and therefore, after the full growth of the city, the tradition included the earlier sites in the periphery which continued to be occupied within the range of *Panch-Kosi* boundary which is still sacred for pilgrimage and circumambulation of Kasi.

B. R. Mani

Mitra, Debala (Ed.) *Exploration in Art and Archaeology of South Asia-Essays dedicated to N.G. Majumdar*. Directorate of Archaeology and Museums, Government of West Bengal, pp. 602, list of plates xxxi + II and line drawings, Price Rs. 800.00

The volume is a collection of 39 essays dedicated to N.G. Majumdar. It covers subjects ranging from anthropology to archaeology including prehistoric cultures through epigraphy, art, architecture, iconography to preservation of not only in India but some even from Bangladesh dedicated to N.G. Majumdar. The Directorate of Archaeology and Museums, Government of West Bengal the publisher of this volume, through Dr. Gautam Sengupta approached Dr. Debala Mitra who agreed to edit the volume. As the volume was to be released as a mark of the centenary of Dr. Majumdar, the proofs could not be shown to the contributors.

The biographical profile of Nani Gopal Majumdar, who died in the hazardous terrain by the side of the Kirthar Range in Sind through the bullets of the bandits in his archaeological camp site near Roheljo-kund just off the Gaj Nat, provides a glimpse of this outstanding scholar who has written on protohistoric and historic archaeology including epigraphy, numismatics, art, iconography, museology and conservation. The first three articles by his son and Krishna Deva, his younger colleague in the Survey, narrated the details of the tragic end which shed light on the life of early field archaeologists, whereas articles 4 and 6 bespeaks about the contribution of Majumdar. The article 5, 7, 8, and 9 deal with different cultural aspect of the country and deciphering of the Harappan script, whereas article 10 to 13 survey the contact area between Central and South Asia which has a direct bearing on the work of Majumdar in Sind. From article 14 onward topics relating to historic period were dealt. The last (39) deals with the restoration of India's tallest Jaina statue. All these articles are well illustrated with plates, line-drawings and maps. The content, language and printing is good.

Krishna Deva has rightly quoted the views of Rao Bahadur Dikshit about N.G. Majumdar that "had he lived a normal lease of life, he would not only have risen to the highest eminence as an archaeologist and historian but the course of the Archaeological Survey of India also might possibly have taken a different turn from what it actually did."

The editor along with other authors deserve our compliments for bringing out this work which is useful to the scholars and researchers. This volume will go a long way to educate and enlighten all those who read about N. G. Majumdar, a pioneer in Indian archaeology.

K. N. Dikshit

Haque, Enamul 2001 *Chandraketugarh: A Treasure-House of Bengal Terracottas*, The International Centre for Study of Bengal Art, Dhaka, Bangladesh, pp. 416 with 678 illustrations including 400 in colour; Price Taka 2500.00, US \$ 50.00

Chandraketugarh in the north 24- Parganas District of West Bengal has been a famous site for its excellent terracotta figures dating back to c. second-first century B.C. with the prominent Sunga idiom, though starting from Maurya period and ending with the Kushan period. The creative urge assumed such wide dimensions during this period that besides a large number of crafts, which signified developments in many fields, it was also expressed in the form of art. Art was invariably associated with the works of various craftsmanship with scientific manipulations. The transformation of life, which owed to fundamental religious and artistic impulses gave expression to a whole genre of terracotta and sculptural arts.

The terracotta art studied in its characteristic features and manipulations of clay of medium and fine fabric has frequently made the critics admire the purpose and excellence of art in this medium. The theme of terracotta

art of Chandraketugarh art style from sites such as Mahasthan, Tamralipti, Pataliputra, Kausambi, Rajghat, Ahichchatra, Siswania, Sankisa or Mathura. But the size, complete composition and better state of preservation of these artistic pieces from Chandraketugarh are amazing.

Dividing the book in six chapters and two appendices, the famous art historian from Bangladesh has discussed about earlier work and excavations undertaken at the site in the past and describing the terracotta art of the site; he has classified the terracottas in 1,2,3 types. He has taken all the pains to include the terracottas recovered from excavations, those picked up as surface finds from the site from time to time and those, which are housed in various museums and in private collections.

The reader of the book, while turning the glossy pages, gets stunned on looking at the beauty and artistic craftsmanship of the terracottas, the kind of which are now rarely found in excavations at this site of South Asia. Though the site has been known since long and visited by stalwarts like A.H. Longhurst, R.D. Banerji, K.N. Dikshit, D.P. Ghosh, K.K. Ganguly, K.G. Goswamy and others, it was also excavated by the Ashutosh Museum of Indian Art, Calcutta University for twelve seasons from 1956-57 to 1967-68 without any detailed report.

The inventory of terracottas from the site in chapter 5, contains description of 963 pieces, ranging from human, animal and semi-divine beings to propitious Kubera rattle toys, most of which are plaque with figures of yaksha-yakshi or human beings. It was noticed that many of the masterpieces described with their illustrations are either in private ownership or in foreign museums of art, such as Asian Art Museum, San Francisco or the Art of the Past, New York or Los Angeles Country Museum of Art, or Museum of Indian Art, Berlin, or Metropolitan Museum of Art, New York. Since they were not discussed much in the pre-Independence era, it seems they could find their way after 1950s. Under the circumstances, the mystery of surfacing of these terracottas remains unsolved. After the passing away of all the excavators of the site, the author

has collected brief notes published in the issues of the *Indian Archaeology - A Review* or from elsewhere and have compiled the data together, giving some idea of the stratigraphy and sequence with year-wise findings.

Besides 963 terracottas, 33 published in various issues of the *Indian Archaeology - A Review* and 30 non-terracotta objects in the collection of the Art of the Past, New York have also been discussed.

The inventory of terracottas include a number of pieces which have been published for the first time and the author correctly states that "this would help the future researchers and the abundance of the materials with their varieties in themes and forms will ultimately provoke a detailed study where adequate attention may be paid to all deserving pieces" (pp. 78-79). The author has suggested the similarities of the Yakshi with hairpins with Egyptian goddess Nisaba and the presence of more than five hair pins in so many plaques from the site negates their *Panchachuda* identity which was propounded once by Stella Kramrisch. He seems to be correct in stating that the rapid progress of urbanization was the cause of shifting from hand-modelling to the use of single and later double moulds for making terracottas for as larger urban population for their various usages. Some of the complete scenes help in identifying the broken and mutilated parts of such terracottas. There may not be any difference of opinion with the author in his statement that the "terracotta was the most popular medium of artistic manifestation of the people of Bengal, particularly, at the dawn of its history". But it is difficult to accept his supposition that the thrust of Aryanisation did not reach the population at large in Chandraketugarh during Maurya-Sunga age where production of anthropomorphic deities was required and the people accepted classic religions only in the beginning of the Gupta period. Firstly, there seems to be nothing like Aryanisation as such as it is an accepted proposition that Buddhist, Brahmanic and Jaina deities in their anthropomorphic forms were made during Kushan period and only a few examples of such depictions during the Sunga period existed. Even at Sarnath, the birthplace of

Buddhism. Buddha's statues were made during Gupta period only and those belonging to the Kushan period were probably the product of Mathura or their copies. Same is the case with Chandraketugarh also, and the terracotta plaque and other figures from this site can not be segregated from such pieces found from other Gangetic sites or beyond. In their subject matter and depictions they have the commonness. But there can be no doubt in stating that the terracottas from Chandraketugarh are superb and show the highest skill of Maurya-Sunga artists who selected clay as their medium of expression, the tradition of which continued in the terracotta art of medieval temples of Bengal, such as at Bishnupur.

This scholarly work, well classified and illustrated, is capable of attracting attention of general readers of Indian art and creating new ideas among researchers on their genesis and technical execution.

B. R. Mani

Srivastava, Gyanendra Nath 2006 *Ancient Settlement Pattern in Orissa (With Special Reference to Bhubaneswar)*, Agam Kala Prakashan, Delhi, pp. 302 including Index, Bibliography, prelims i-xv, no. of plates-43 : Price Rs. 900.00

The present book is an outcome of intensive field work undertaken by the author, as the material remains found during the village-to-village survey and excavations furnish important evidence to study the history and settlement pattern of the successive cultures that emerged in Orissa with particular reference to Bhubaneswar.

Bhubaneswar is renowned for a magnificent group of temples showing the rise and culmination of Kalinga architecture. The history of Bhubaneswar and its environs dates from as early as third century BC to the fourth century AD. We are already aware of the extensive ruins of Sisupalgarh - an ancient fortified town - the remains of which revealed that the site was in occupation from the

early third century BC to the middle of the fourth century AD while the defences of the town had been built in the beginning of the second century BC. Udayagiri and Khandagiri are the two rock-cut monastic shelters of the Jains which also command a unique position, where simple monastic dwellings were established that speak of village ethos. The Dhauli and its neighbouring areas have been identified as the new royal establishment, founded by Asoka as could be gathered from the study of chronology, settlement pattern, ceremonial principles of layout and planning apart from the associated traditions.

In recent times, the research on settlement archaeology received considerable attention in order to reconstruct the past through the study of various artifacts, in addition to the other associated finds that come down to us by undertaking the field surveys. This book examines the rich source material for the study of evolution of settlements from the sixth to the medieval period, apart from development and decay with the help of the data collected from the excavations of habitational sites at Khalkatapatta and Lalitagiri in districts Puri and Cuttack respectively. Material is also derived from the village-to-village surveys in the earlier mentioned districts. During these surveys, some village settlements in coastal plains and hilly tracts were noticed. There are many other references in the form of literature and epigraphic material to trace the missing links and corroborative evidence. The terms like *nagara*, *khibara*, etc. mentioned in the Asokan inscription; Gandhasindhu of the Ganga inscription, have been identified and analyzed on the basis of this field survey.

It has been observed that for the rise of diverse settlements in the area, geomorphology, natural resources like hills, forests, alluvial plains, lateritic tracts, rivers, lakes, the human footprints as also the conditions favourable for hunting and fishing enabled the settlements to flourish in successive periods of occupation. The well-watered alluvial plains were suitable for cultivation resulting in the rise of agrarian settlements which made the area a place of Royal court where one notices large-scale occupational settlement, divided into two broad

periods, viz., early period of royal court as at Sisupalgarh (from c. 3rd century BC to 4th century AD) when the society constituted of royal people, civil and military personnel, royal servants, soldiers, traders, craftsmen, etc. Sisupalgarh flourished as a centre of trade and commerce maintaining trade contacts with the Roman world. The Asokan and Kharavela inscriptions, relief art of Udayagiri caves and dedicatory inscription also speak of the contemporary society. The study of the settlement pattern suggests the presence of royal or political and religious settlements and the place was not abandoned totally, but there was decay in population and the desertion of royal camps and capital was perhaps due to the decay of royal power. Thereafter, Bhubaneswar emerged as a religious centre associated with the Saivites.

The vast field data collected by the author has been handled systematically in seven chapters starting from geomorphology and climatic conditions of the region besides the study of the nature of settlements and habitation sites followed by the political, economic and religious background of the region to assess the evolution and decay of settlement. With a number of black and white illustrations and maps of Bhubaneswar and the adjoining region, this book certainly has great research value, with particular reference to the study of settlement pattern.

Arundhati Banerji

Chhatteropadhyaya B.D., Gautam Sengupta and Shambhu Chakrabarty (Eds.) 2005 *Annotated Archaeological Atlas of West Bengal Vol.I*, Centre for Archaeological Studies & Training in Eastern India, 4 Camac Street, Kolkata, by Manohar Publishers & Distributors, New Delhi, Vol. I, pp. 120, size 45x30 cm including illustrations, bibliography and index; Price Rs. 2500.00

The present volume is a sumptuous publication in 10 parts with contributions from Sutapa Roy, Banasari Guha, Sheena Panja, Bishnupriya Basak, Sharmi Chakraborty,

Suchira Roychoudhary, Pranab K. Chhatteropadhyay, Rupendra K. Chhatteropadhyay and Srimoyee Mukherjee. It is conceived with the aim of making a visual presentation of the cultural profile of West Bengal from prehistoric times to AD 1858.

With an introduction the Atlas starts along with a map of West Bengal, showing the distribution of Prehistoric and Protohistoric finds. The next part presents the physiography of West Bengal, a flat featureless alluvium plain, divided into seven sub-regions. The 3rd part has three maps of geology, geomorphology and quaternary geology, thereby shedding light on the land-forms and natural features of West Bengal. The 4th part has 8 maps on the spatial distribution of Paleolithic artefacts, one of them has covered the whole of West Bengal and the other dedicated to different sub-regions. Part 5 deals with microlithic artefacts and their spatial distribution and is again accompanied by maps showing general distribution and different clusters of microlithic artefacts. The next part deals with Neolithic. Three clusters have been marked on the map. But the chronological position of Neolithic period has remained a question in the absence of a proper excavation. The next part on Black and Red Ware culture shows two maps, one on explored sites and the other on excavated sites which suggests that Chalcolithic has a late beginning in this region. The last one deals with Copper Hoards in West Bengal. The types found may not have any direct bearing with other copper hoard types of Gangetic doab and other adjoining region. The use of the term 'Copper Hoard' for these objects in Eastern India requires reconsideration. They could form the part of the Early Chalcolithic of West Bengal and could also be associated with other chalcolithic cultures of Central India. In the end, an Index of find-spots (not plotted on maps) is given.

The fifty maps produced in this volume has been digitized by employing new techniques accurately plotting the archaeological sites existing to their geographical coordinates. The atlas has been annotated by adding notes to texts and diagrams giving explanation and comments

so that one may understand the different cultural periods shown in the maps. The archaeological finds are shown in the atlas with the help of photographic images, drawings and notes.

It is not often that one comes across such a publication which is undoubtedly an outcome of the painstaking work of the team which gives not only much new information but also new perspectives for the use of researchers and archaeologists. The editors along with others deserve our appreciation for this work.

K. N. Dikshit

Banerjee, Arundhati (Ed.) 2006 *Hari Smriti Studies: Art, Archaeology, and Indology*, (Haribishnu Sarkar, commemorative Volume in Two Parts) New Delhi; Price 4800.00

'Hari Smriti' - Studies on Art, Archaeology and Indology published in memory of Late Dr. Haribishnu Sarkar, Former Jt. Director General of Archaeological Survey of India is a befitting tribute to the scholar, a person loved by all. I wish, I should have also been one of the contributors in this commendable effort of Ms. Arundhati Banerjee. There are two volumes containing sixty one articles contributed by eminent scholars of the time. These articles have been classified in eight section, i.e., Section-I: Haribishnu Sarkar - Reminiscences and Tribute by his close friends and associates like M.A. Dhakey, B.D. Chattopadhyay and others, Section-II: Art and Iconography, Section-III: Architecture, Section-IV: Archaeology, Section-V: Epigraphy and Numismatics, Section-VI: Antiquities and Museums, Section-VII: Conservation and Heritage Management and Section-VIII: Miscellaneous.

Reminiscences and Tribute to Dr. Sarkar very aptly deal with his many-sided personalities - a man of deep intellectual understanding, a prolific writer both in Bengali and English and a good teacher. I take this opportunity to

pay my respectful homage to the departed soul.

The art and iconography section in volume-I has been enriched with the papers of eminent senior scholars. While most of these articles are original research work and are of merit. Special mention may be made of Debala Mitra's articles on the main stupa, Udayagiri (Orissa) which provides a detail study of the brick stupa from art and iconography point of view. This brick structure excavated by her is a rare source of Buddhist art and iconographic studies in Orissa, which are quite distinct in form and style. Similarly the study of M.A. Dhakey on Temple Fragments from Kaveripakkam now on display in the Govt. Museum, Chennai is unique. With meticulous details and a lot of line drawings the author gives the reader an opportunity - the way one could study a small collection through a deep understanding. The paper of Ajay Mitra Shastri throws new light on the Buddhism in Deccan during the Satavahana Age (c. mid first century BC to mid third century AD). Mallar Mitra's article on Saptaratnas in Buddhism: Their Origin, Function and Depiction deserve special appreciation as her approach appears to be dealing with the original source of Buddhist texts.

In section-III, there are eight papers dealing with architecture. It is pertinent to note that section-II, i.e., in Art and iconography chapter, also deals with a lot of material on architectural studies, say for example - article of Michael W. Meister. In this section Krishna Deva's paper on Interrelation in Regional Schools of Indian Architecture is a good survey providing regional character of Indian architecture and their hidden relations. D.R. Das' article on Roman influence on Indian architecture and D. Dayalan's on Behati: New light on Gupta Architecture examine the issues commented upon earlier by scholars, providing fresh light on the subjects.

Vol-II is devoted to Archaeology, Epigraphy, Numismatics, Antiquities, Museums, Conservation and Heritage Management and two papers on Modern art. The Archaeology Section covers a wide variety of subjects though Pre-history, Protohistory, Harappan, Megalithic,

Neolithic, Aryan problems, etc. The article of N. Kamleswara Rao on Aspects of Pre-historic Astronomy in India is quite a new approach in reassessing the subject. M.K. Dhavalikar's paper on Harappan Landscape of Western India is very informative pertaining to the availability of materials and expression of Harappan urbanization. Here is an article of J.S. Nigam which adds to our knowledge of Neolithic pottery of North Eastern and Central Eastern India.

Another group of articles in this volume draws our attention to the recent excavations of the historical sites and also on the historiography of the study of such monuments – B. R. Mani's article on the history of excavations in Sarnath and B. Bandhyopadhyaya's article on the discoveries, made during recent excavation of the famous site of Udayagiri in Orissa.

Section-V of the volume deals with Epigraphy and there are six articles. The section rightly begins with the article of Gauriswar Bhattacharya: Two Donations in Favour of the Mahasanghikas of Mathura which, as usual with him, throws new information and new light on the subject. Other articles in the section are also informative specially the study on the chronology of the Pala Dynasty based on a Gold Coin from Bangladesh, has to be noted with care.

Section-VI & VII deal with Antiquities and Museums, Conservation and Heritage Management. L.K. Srinivasan's article on "Cultural Patrimony and Heritage" with special reference to retrieval and preservation of cultural property is a source of rich information on the subject. C.B. Patil's articles on Protection of Cultural Property vis-a-vis Antiquarian Legislation and People in India raises some knotty problems in respect of legislation and the role of Civil Body. I.K. Sharma's article provides a comprehensive account of beginning of Museums, Museum Movement in India and the history and growth of Site Museums. The article of N. James on Monument Management and Urbanization – A Case Study of Bhubaneswar is another burning issue of the day due to rapid urbanization and

population growth. Of other two articles, the article 'Not very Long Ago' by Ajit Kumar Dutta provides a good note on Haribishnu Sarkar – a homage to him.

The forward written by Ms (Dr.) Kapila Vatsayan has further enriched the volume.

Last but not the least, the volumes are well and neatly produced and shall be good asset to libraries.

S.S. Biswas

Soundararajan, K. V. 2006 *Nagarjunakonda (1954-60)*, Memoir of the Archaeological Survey of India 75, New Delhi, pp. 615; Price Rs. 1000.00

It is the second volume of Nagarjunakonda Excavation Report dealing with the material remains of historical period identifying the religious and secular structures, inscriptions, coins, pottery and other excavated antiquities. It is divided into four parts. Part A which has three chapters deals with general introduction, lay-out of the excavation and chronological framework including historical background of the valley. The sources for chronological consideration were also examined. Part B also has three chapters and Chapter IV deals with the structures of the Ikshavaku city of Vijayapuri including the lay-out and environs of citadel, and other public and private buildings, roads, rest houses and public sanitation system, whereas chapter V highlights the religious and ritualistic structures of the Ikshavaku city. The chapter VI is devoted to pottery of Early Historic, Historic and Mediaeval period.

The Part C is again divided into two chapters. The chapter VII pertains to the excavated antiquities computed by several authors which include relic caskets, terracottas, gold and silver objects and also items of shell, ivory, bone and glass. The Chapter VIII is about the coins of Early Historic and Mediaeval period.

The Part D belongs to epigraphical discoveries which also include texts and translation of records as published by the Epigraphy Branch of the Archaeological Survey of India. There is also an appendix having a list of excavated sites identifying the location of the structures in the valley.

The monograph is quite exhaustive and useful for the students of Indian art and architecture. It has excellent line drawings showing the plans and sections of the structures and black and white photo illustrations numbering 200 which enhances the value of the work. However, the Archaeological Survey of India deserves all praise for bringing out this useful and scholarly monograph.

K.N.Dikshit

Wakankar, V.S. 2005 *Painted Rock Shelter of India*, Directorate of Archaeology, Archives and Museums, Government of Madhya Pradesh, Bhopal, pp. 420, with figures, maps and sketches; Price Rs. 550.00

The book which covers about 1532 rock shelters from 36 regions spreading over the states of Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Orissa and Karnataka, is a vivid and informative data bank of rock art research in India. This voluminous book deals with different aspects of rock art of the region under study.

Chapter I is an exhaustive list of discovered rock art sites of India with references to other sites in the world. Here the author very rightly urges for more and more excavations of rock art shelters to get a clear picture about the users of these shelters. Distribution of rock art sites with every detail in codified and tabular form is listed in chapter II. The table is useful as it gives every possible information about a particular site. It includes discovery, location, content of rock art, their style, associated finds and inscriptions along with sketches and maps of the rock art sites.

The selection of rock type amply corroborates that sandstone was most preferred as it is suitable for art activity. The most difficult issue of rock art study, i.e., dating are done as usual by methods like typology, style, patination, encrustation, comparative study of different art forms of ancient time, etc., though besides stylistic study all of them are dealt superficially. Stylistic classifications are illustrated with sketches and descriptions as well. Excavation reports of rock shelters of India also found its place here. Different faunas in different actions, found in these rock arts, are documented. Human activities are also discussed which tell in turn about the weapons used by the contemporary people. The author has also explained the motive behind the art expression to different ceremonial customs and testified it with different representations, depicted on these rock walls. Associated culture of the excavated rock art sites, origin of such rock art activity, the artist, are discussed. In the concluding chapter the art has been viewed with its inherent values and aptly praised not only for its artistic excellence but also for the deep human philosophy that gave birth to such art.

As painted rock shelters are presently known from Kashmir in the north to Tamilnadu in the south and from Gujarat in the west to Meghalaya in the east, it would be more precise if the title of the book delineate the actual area, i.e. central India rather than India. Besides that some overlooked points are map showing the distribution belt of sandstone and granite belt in India, same symbols used for these two different rock formations, etc. The Directorate of Archaeology, Government of Madhya Pradesh deserves due appreciation for bringing out such a resourceful book on rock art. It will undoubtedly be a guidebook for the future researchers as well as art historians.

Mukta Raut Dey

Pande, B.M. 2006 *Qutub Minar and its Monuments. Monumental Legacy Series*. Oxford University Press, New Delhi, pp.95, 25 figures, 29 photographs; Price Rs. 395.00

This is a small book about a large group of monuments. *Qutub Minar and its Monuments* forms part of a series on the 21 cultural sites that have been listed as World Heritage sites. The 'sites' are of several types. They range from historic complexes like Sanchi and Humayun's tomb to the Nilgiri Mountain Railway and the Chhatrapati Shivaji Terminus (formerly Victoria Terminus). The volumes in this series have been kept deliberately brief in order to cater to an interested lay audience and was conceived when Bela Malik was a commissioning editor of Oxford University Press.

The first chapter provides a historical and archaeological backdrop to the monuments. It begins by summarizing the archaeology of the Delhi region from prehistory till the advent of the Tomar Rajputs who are represented in the Qutub area by their citadel called Lal Kot. The political history of dynasties from the Rajputs (c. 11th century AD) till the later Mughals (c. 18th century AD) is then chronicled in relation to the buildings and structures they constructed in this area.

The three chapters that follow form the core of the book. Naturally, it is the monuments of the Qutub complex which are most elaborately discussed (in chapter two). The descriptions of the extant tombs, mosque, minars and pillars combine details on architecture and the character of reused material especially in the Quwwat-ul Islam mosque to the contents of various inscriptions. Apart from the well known ones in the medieval mosque and on the iron pillar of the Gupta period, the book should help visitors spot lesser known ones. For instance, among the later inscriptions engraved on the iron pillar is one of the 16th century which records the name of an Ali Asghar Hussain, son of Israel. The Arabic and Nagari epigraphs on the Qutub Minar are especially interesting because these immortalize, on the one hand, verses from different Surahs of the Quran, to

the names of architects, artisans, and carpenters (like Nana, Salha, Lola, Lashman and Dharmu Vanani).

Chapter three contains a very brief survey of the monuments to the south and south-east of the Qutub complex. Much of this form part of what is now called the Mehrauli Archaeological Park. The last chapter describes monuments in and around Mehrauli. Among the more important monuments, there are descriptions in these chapters of a number of tombs such as those of Jamali Kamali, Balban, and Adham Khan; the dargah of Qutub Sahib and the Yogmaya temple, at both of them flower fairs are presented during the Sair-i-Gulfaroshan; as also the Jahaz mahal and Hauz-i-Shamsi. Many unusual structures, though do not find mention. For instance, one would want to know whether monuments like the old pigeon house which was north of Saubate tomb and the Hijron ka Khanqah can still be located.

Such lesser known structures are meticulously recorded in the section on the 'Mehrauli Zail' in Zafar Hassan's *tour de force* of Delhi's monuments. Perhaps B.M. Pande may consider adding some insights as and when this useful book's paperback edition appears, about whether all those structures described in Hassan's work have survived the process of 'modernization'. One can only hope that they have not suffered the same fate as the largely destroyed prehistoric landscape sprawled across the ancient Aravallis on which the better known structures of the Qutub complex still stand.

Nayanjot Lahiri

Lal, Krishna 2006 *Peacock in Indian Art, Thought and Literature*, Abhinav Publications, New Delhi, pp. 169; Price Rs. 1500.00

The present monograph related to peacock by Krishna Lal has been dealt in detail, including the concentration and references in ancient literature and also its medicinal properties. It has 104 coloured plates and 25 sketches.

There are 4 appendices; the one is devoted to Takht-e-Taos and other three about peacock in Brihat Samhita, Chakra Samhita and Sushrut Samhita. India has declared this bird as National Bird.

The work is divided into six chapters. First chapter describes the bird in history, mythology and literature, whereas chapter 2 deals its representation in stone, terracotta and bronze. The chapter 3 is about this bird appearing in paintings, chapter 4 representations in decorative arts and chapter 5 in textiles. The stylised design of this bird could be seen on Baluchari sari or in kimkhab or brocade work or kalamkari. The last chapter is about its uses - as food, medicine, trade item and for ceremonial purposes.

The author traces the rearing of the bird by the Greeks from the time of Varro (2nd century B.C.) and Romans served its at royal banquets. It was introduced in England by Romans and in the Middle Ages they were toasting including the name of peacock with others. However, Asoka, the Mauryan emperor prohibited the killing of the bird by a degree as back as in 3rd century B.C.

Ancient Indian literature is full of references to this bird and Ramayana bears testimony to it that in banquet hall of Ravana, peacock's meat was served regularly (Mukherjee 1979:3). Lal has expressed that in every art expression, the bird has beautifully portrayed and also been depicted as sacred one, as vahana of Kartikeya, an important deity of Hindu pantheon and an absent lover in miniature paintings. In Brihat Samhita it is mentioned that when a halo resembles the peacock's neck in colour, there will be excessive rain, when it has variegated colours, a king will be slain, when it is of smoke colour, there be unsafety or fear and when it is of the colour of the Ashoka flowers (red) or is of the rainbow, wars will rage. In Chakra Samhita, the recipes of *Mayurghrita* and *Maha mayurghrita* are given; whereas Sushrut Samhita mentions that flesh of mayur is beneficial to skin, helps the growth of hairs and improves the voice.

The contents, language and printing are fine and the colours used in illustrations are appropriate which added value to the work. It is useful for study by the students, scholars and general readers.

K.N.Dikshi

Mani, Chandro Mauli 2005 *A Journey through India's Past*, Northern Book Centre, New Delhi, pp-126; Price Rs. 400.00

The book is a precisely written documentary of Indian history with a large coverage of subjects on early Aryans to the age of fragmentation after the Pala Rule in the North. The entire chain of dynastic history is so interlinked with global events and movements that the author only deserves praise for performing this task of critically discerned assemblage of facts of incalculable dimension which no ordinary chronicler could think of to do.

The two appendices; 1. 'Indo-Aryans in the Middle East' and 2. 'The Evolution of Buddhist Sculpture in India and Brahmanical Influence on the Same' are fine pieces of research; although it is true that the book is 'neither for researchers, nor is meant to be an interesting book for young adult'. There is something redeeming in it for every class of reader who will find the book factually authentic, concise and delectable. Credit for its neat printing goes to the Northern Book Centre, New Delhi.

The book will be more interesting in further impressions with illustrative depictions, as maps taken from the historical atlas of the Indian Peninsula with acknowledgement to Oxford University Press; it also needs revision of glossarial text and bibliography.

I.M. Tripathi

Mushrif-Tripathy, Veena & S.R. Walimbe 2006 *Human Skeletal Remains from Chalcolithic Nevasa*, BAR International Series 1476, Oxford.

Here is an excellent report on the skeletal remains found at Nevasa in the excavations conducted by H.D. Sankalia and his colleagues from 1954 to 1956, i.e., some fifty years ago. A work of this nature certainly takes time if one has to do a thorough job. The study presented in this volume is based upon osteobiographic analysis recorded in 52 tables and illustrated with 107 figures containing photographs of bones. The authors have dealt with subjects like metrical analysis of dentition, cranio-facial elements, age determination, sex determination, demographic features, skeletal pathology, dental pathology, etc. They have also given the archaeological aspects of the discovery, such as the excavations, modes of disposal of the dead, pot forms, etc. Most importantly, they have given two contextual chapters – Human Skeletal Evidence in the Indian Subcontinent (Mesolithic, Harappan, Neolithic-Chalcolithic, Megalithic) and Chalcolithic Culture and Archaeological Context of Nevasa. We have, therefore, in this publication a complete overall picture of the burial practices in ancient India along with special studies made by the authors on the skeletal remains from Nevasa. It is indeed a model of publication for all the future researchers working in the field of Physical Anthropology in India.

S.P. Gupta

archaeological researches in India for the last five decades. It has also included some glimpses on the researches in the inter-disciplinary subjects as archaeozoology and archaeobotany. The subsequent chapters deal in brief with Palaeolithic, Mesolithic and Neolithic cultures with their salient features, distribution, important tool-types and their manufacturing techniques. In the subsequent chapter, he surveyed the non-Harappan Chalcolithic cultures and its bearing on religious beliefs and practices.

In the appendix-I, he has highlighted the characteristic elements of iron using megalithic cultures. The prominent archaeological sites of India in maps and words also found its place in appendix II. This will help the students to know the exact location which is often missing even from well informed books. The glossary covers a brief description about most frequently encountered terms in present day archaeology. The bibliography is also quite good for a beginner, pursuing in this field of study. The book will be useful for students and general readers who have interest in the archaeology of the sub-continent. The book is recommended for departmental Libraries of the Universities.

Mukta Raut Dey

Jain, V.K. 2006 *Prehistory and Protohistory of India - An Appraisal*, D.K. Printworld (P) Ltd., New Delhi, pp 213; Price Rs.150 (paper back)

This book is a survey of prehistoric and protohistoric cultures of India. It starts with an introduction defining prehistory and protohistory including information on tools and technologies, settlement pattern, distributional framework and ecological background. In the second chapter the author has reviewed in brief the activities in

REPORT OF THE XXXIX ANNUAL CONFERENCE

Report of the XXXIX Annual Conference of Indian Archaeological Society held at M.H.Krishna Institute of Indology, Bangalore from 15th - 18th December, 2005.

The Chief Guest of the Annual Conference of the Indian Archaeological Society, was His Holiness Shri Shri Ravi Shankar, Founder, Art of Living Foundation. Prof. M. S. Thimmappa, Vice-Chancellor, Bangalore University presided over the Inaugural Function. Prof. D. N. Tripathi, Chairman, Indian Council of Historical Research inaugurated the function on the 15th December, 2005 at Central College Campus, Bangalore. Prof. D. N. Tripathi also released the *Puratattva* No. 35, a Journal of the Indian Archaeological Society. Dr. S.R. Rao, a noted archaeologist gave the Presidential address of the Indian Archaeological Society.

The academic sessions were held from the second day of the Conference till the Valedictory Session on 18th December, 2005. Some of the papers were also read in the joint sessions.

16th December 2005.

Morning session

The theme of the seminar of the Indian Archaeological Society was '*History & Archaeology of Long Distance Trade*'. It was introduced by S.P. Gupta and K.N. Dikshit. A number of archaeologists participated in the discussion. The session was chaired by Sri J. P. Joshi and three papers were presented followed by discussion.

Shri L. S. Rao

Recent Excavations at Bhirrana in Haryana.

Ms. Punya Baruah

The History & Archaeology of Long Distance Trade in India.

Shri Subas Chand

The Art Activities in the Chalcolithic Culture of the Middle Ganga Valley.

Afternoon Session

The session was chaired by Prof. A. Sundara.

Prof. Vidula Jayaswal
Gupta Temples at Bhitari.

Dr. Ashok Singh
An unique Copper Mirror and Iron Lamp stand from Aglabir, Distt. Mirzapur, Uttar Pradesh : A Study.

Dr. A. K. Singh
The Kalachuri Bhaisasura at Singhpur in Satna.

Dr. P. Venkatesaiah
Ajanta Excavations.

17th December, 2005.

The Session was chaired by Prof. J. N. Pandey and Shri J. S. Nigam.

Dr. D.S.Dhania
Indus Language and Fate of Saraswati River.

Dr. R. K. Mohanty & Dr. Monika Smith
Sisupalgarh 2004-05.

Shri Arun Raj T.
Recent Researches on Arikamedu.

Dr. D. Bengra
The Megaliths of Chota Nagpur Region.

Prof. S. Pradhan
New Rock-Art Sites in Orissa.

Shri N. Tahir & Abhijit
Mystery of Queen Soaperia, the Debate Ends but the Search Continues.

Dr. S. K. Joshi
Settlement Pattern from Neolithic Huts to Rashtrapati Bhawan.

Dr. Ajit Kumar
Vilinjan: Its History, Trade and Archaeology.

Prof. J. N. Pandey
Explorations near Chitrakoot.

Shri Bhanu Prakash
Harappans of Gujarat: A Gateway to the Heritage Tourism.

Dr. K. Rajan
Excavation at Thandikudi, Tamil Nadu.

Shri Jitendra Singh
Archaeology of Aligarh District. Naulakha.

Shri Kamal Kant Bagat
Paleo-Ethnology and Cultural Heritage of the Indigenous Indians: Central Narmada Valley, Madhya Pradesh.

Shri K. G. Venkatesh Jois
Rare Sketch of Ikkeri Temple.

Mrs. Sushma Arya
The Coins of Damabhuti.

18th December, 2005.

The session was chaired by Prof. V. N. Misra and Dr. B. R. Mani.

Shri Mukesh Kumar
Settlement History of District Kheri, Uttar Pradesh.

Shri Sandeep Kumar Chaudhary
Painted Grey Ware Culture in District Farukhabad

Prof. A. Sundara
Archaeology of Ash mounds.

Dr. P. Rajendran
Pre and Proto-Historic Cultural Evidence from Quilon District of South Kerala.

Dr. B. R. Mani
Kushan Satellite Settlements of Mathura Metropolis along the Aravali Route.

Dr. Surbrata Chakrabarti and Shalini Thapa
Excavations at Tashiling: A Preliminary Report

Ms. P. Binodini Devi
Thongjao Potter: An Ethno-Archaeological Study

Dr. R. N. Kumaran, & M. Sarnaya Kumaran
An Architectural Survey of Megalithic Burials in Palani Hills, Tamil Nadu.

Ms. Nupur Das Gupta
Settlement Patterns in Early History: Queries and Evidence from Two Regions.

Ms. Neelima Pandey
Community Life during Mesolithic Age in India.

Dr. K. Rajan
Ancient Irrigation Technology in Tamil Nadu with special reference to Sluice Technology.

Dr. V. Selvakumar and K.P. Shajan
Recent Investigation at the site of Pattanam (Muziris ?), Kerala.

Shri Umesh Kumar Singh
Dwelling Houses in the Neolithic Cultures of the Mid-Ganga Plains: An Ethno Archaeological View

Shri Anoop Kumar Singh and Dinesh Kumar Chauhan
Exploration and Archaeological Perspective of Rae Bareilly, District, Uttar Pradesh.

Shri Santosh Kumar Singh
Beginnings of Urbanization in Middle Ganga Plain: A Technological and Ecological perspective

Drs. V. H. Sonawane, K.K. Bhan, S. Prathapchandran and K. Krishnan
Excavation at Bagasra 2004-2005: A Preliminary Report.

Dr. D. P. Tewari and Deep Shikha
Faunal Remains from Pirvitani Sarif Excavations.

Dr. Sumanben H. Pandya
Mesolithic Settlements in Sabarkantha: Beginning of Agriculture.

Dr. R. K. Mohanty
A Comparative study of Beads from Vidharba Megaliths, Maharashtra.

The function ended with a vote of thanks to the M. H. Krishna Institute of Indology, Department of Sanskrit, Bangalore University and Directorate of Archaeology and Museums, Government of Karnataka. The delegates also thanked the Mythic Society for the success of the Conference.

K. N. Dikshit
General Secretary

Society's Activities

Award of Scholarship

IAS supported, with scholarship, the training programme in Field Archaeology of Mr. Ven Sophorn and Mr. Hou Nalamony, Royal University of Fine Arts, 2 Samdech Ouk Street, Daun Penh, Phnom Penh, CAMBODIA. They are presently with APSARA, Siam Reap (Angkor Vat). They were imparted training at Chennai (temple art and architecture), Sisupalgarh (excavation), Deccan College, Pune (Sciences in Archaeology) and Indraprastha Museum of Art and Archaeology, New Delhi (archaeological theory and museology). They were honoured on 15th December 2005 with 'Dr. A.P. Khatri Memorial Award' for Excellence in Archaeology in the annual conference of the Society held at Bangalore from 15th December through 18th December 2005.

Workshop on Buddhist Art and Archaeology

IAS has also started one-day workshop for students in the subjects of art, architecture and archaeology. One such seminar was held in November 2006 in the premises of the Society. The subject of the workshop was 'Buddhist Art and Archaeology'. Around 120 students of the S.P.M. College, University of Delhi, participated in it.

Report on Archaeological Investigations along the Kerala Coast

Under the approved programme of the Archaeological Survey of India, in March 2006, IAS in collaboration with the Department of Archaeology, Government of Kerala, conducted explorations in Thrissur, Ernakulam, Alappuzha and Thiruvananthapuram districts of Kerala (Fig.1). Explorations were confined at Kodungallur and Pattanam, along the northern and southern banks of the Periyar River. The field-work was done by S. Vijayakumar, a Research Associate of the Society.

THRISSUR DISTRICT

Kottappuram: The first site to be explored was Kottappuram (N: 10°11'48.6"; E76°12'38.8") of Kodungallur Taluk, which lies in the lowlands bordered by the Chalakkudy and the Periyar rivers on the east and south respectively and the Arabian Sea on the west. Sand, silt and alluvium brought down by these rivers have played important role in the land formation of this region. Backwaters, narrow channels and canals also form the integral part of this region facilitating inland navigation.

Kottappuram is so named because of the presence of a dilapidated fort. The fort is also known as the Cranganore Fort which was built by the Portuguese around 1503 AD. The site is 5 km south of Kodungallur which is under the ownership of Mr. Vincent and Mrs. Doty.

Ceramics

Explorations at Kottappuram area have yielded sherds of red ware with or without slip, Grey Slipped Ware, Chinese porcelain and Turquoise Glazed Ware of Indo-Sassanian type. Red Ware is predominantly found in the site. In the case of slipped Red Ware, thin slip was applied on the surface of the pots. They have dabber marks and applied designs on the outer surface. These paddle hammered potsherds have parallels at Arikamedu though their actual date is still not established. Even today in many parts of Kerala, particularly in Thiruvur district, the grooved paddles are used for beating the clay pot in leather hard condition. Potsherds with segmented rims were also noticed. Red wares without slip are represented by bowls with or without ring bases. In this case, the surface of the bowls is treated with self-slip.

Another important fabric is a grey ware treated with a thin light-grey slip on the outer surface. In this case the pottery is made of fine, well-levigated clay and is fired in a high temperature. A thick dark-grey slip is applied on the surface of the vessel which is in turn coated with a thin light-grey slip. Non-plastic inclusions are not visible in the cross section of the walls or on the surfaces. The walls are compact and the particles are not visible with naked eye. Fine regular striation marks are visible on the inner surface of the pottery. The light-grey slip is possibly made of kaolin and the slip is poorly bonded to the vessel surface. It seems to be an imported variety since the clay used in this ceramic is not found locally.

Porcelain sherds were also recovered from the surface. The background is white and the floral motifs are executed in deep blue. The main shapes include bowls and dishes. Along with the porcelain were found sherds of glazed ware having light green glaze on both the surfaces. Some sherds

have white glazing and the interior of the sherds are painted with polychrome designs. A Turquoise Glazed Ware of Indo-Sassanian type is also found on the site. The glazed wares generally have ring bases.

A terracotta ring-well has been noticed *in situ* at the land of Mrs. Doty. Each ring has 32 cm height and 62 cm diameter. The site has also yielded a high-necked spouted vessel with globular profile. It has a potter's mark on its neck. Typologically, most of the ceramics may be tentatively dated between 9th and 18th centuries AD.

Elavanchikkulam: The site is situated near to the famous excavated site of Mathilakam. Exploration at Elavanchikkulam (N: 10° 17' 25.3"; E: 76° 10' 17.3") revealed numerous potsherds with dabber marks and Chinese Celadon wares. The sherds are similar to those from Kottappuram. Abundant occurrence of ceramics of foreign origin in Kodungallur region indicates that during the Early Medieval period the region witnessed a flourishing trade relation with the countries of the Persian Gulf and the South China Sea.

ERNAKULAM DISTRICT

Pattanam: The next area of exploration was Pattanam (10° 09' 19.4" N; 76° 12' 40.2" E) located on the left bank of the River Periyar in Paravur Taluk of Ernakulam District, Kerala, at a height of 3m above mean sea level. The site is 8.5 km south of Kodungallur (Cranganore) and 204 km from Thiruvananthapuram, the capital of Kerala.

Recent archaeological investigations by Shajan, Selvakumar and later by the author give some hopes for the identification of the ancient seaport of Muziris. The author has observed the following cultural remains at the site.

Structural Evidence and Ceramic

During the course of exploration, naturally exposed burnt brick structure related to the early centuries of the Christian era has been noticed. The structure is oriented

towards roughly NE-SW and NW-SE directions. The dimensions of the bricks are 40 cm length, 21 cm breadth and 5 cm thickness. Over the burnt brick structure has been found a small sherd of Rouletted Ware with typical 'concentric indented rouletted' patterns. Fabrics of Red Ware mainly constitute bowls and storage jars. The bowls are treated with a thin coat of bright red slip. They are marked by thin section and featureless rim.

Another important fabric is a white-slipped ware similar to Coarse Ware 2a (Ca. 50 BC-AD 50) from Arikamedu. The white slip is possibly of kaolin. Slip is poorly bonded to the vessel surface. The cross-section shows a greyish core.

Beads of semiprecious stones such as carnelian and banded agate, and also glass are associated with the brick structure. Barrel shaped, biconical as well as globular beads have been recovered from the site. Bricks, potsherds and beads found at Pattanam are very similar to those found at other Indo-Roman sites of south India.

ALAPPUZHA DISTRICT

Purakkad: The next important area of exploration was Purakkad (N: 9° 21' 5.9"; E 76° 22' 4.6"), a coastal site, located in Ambalapuzha Taluk of Alappuzha District. It is a lowlands region with cultivable lands, especially paddy fields. The land is drained by the famous river Pampa.

Purakkad was subjected to marine transgressions many times. About 1 m below from the surface has been found huge logs still in good condition. Native people say that about 40 years ago the sea was about 1 km away from the present coastline.

Purakkad has been tentatively identified with Bakarei which is mentioned by Pliny as Becare. However, the identification of Becare with Purakkad is still a matter of controversy. Medieval documents show that during the time of the Portuguese the place was known as Porca. It was a Portuguese trading centre with huge warehouses.

A medieval Portuguese church known as Holy Cross Church built in AD 1410 is still a living church. Another important structure of the region is a medieval Masjid of a Muslim Saint. Purakkad also yields a small dilapidated Naga shrine of ancient period. The main deity of this shrine was a female Naga devata. Rectangular flat roof-tiles with wedge-shaped ends (only one end) are scattered over the area. Such roof-tiles have also been reported from Cheraman Parambu, Kilattali and Tirukkulasekharapuram, all near Kodungallur. The roof tiles recovered from the site are identical to the early medieval ones recovered from many parts of Karnataka.

THIRUVANANTHAPURAM DISTRICT

Vizhinjam: It is a small coastal town situated on the outskirts of Thiruvananthapuram, just 16 km away from the city centre. Kovalam beach is about 3 km away from Vizhinjam.

Vizhinjam (N: 8° 22' 44.2"; E: 76° 59' 8.1") was an ancient sea-port of the Ay rulers. Literary evidence shows that the fort of Vizhinjam was destroyed by the Cholas around 10th century AD. Recently, Ajit Kumar of the Kerala University and the officials from the State Archaeology, Kerala confirmed the existence of an ancient fort at Vizhinjam. The site was revisited by the author. During the course of exploration in this region the remnants of a huge circumvallation, probably of 8th-10th century AD, have been noticed. The structure has outer veneering of dressed stones. Fifteen courses of veneering are extant at one place. Core of the wall constitutes stone rubbles and mud. The binding material is mud. Dimensions of the veneering stones are as follows: length 26-37 cm; breadth 16-24 cm and thickness 10-14 cm.

Mamom: During the exploration a new megalithic site was discovered at Mamom (N: 8° 39'; E: 76° 48') near Attingal. A small ephemeral stream runs near to the site. The site is located on the western periphery of the midlands, about 7 km inland from the seacoast and 20 m above sea level. Earlier the same explorer had discovered a Palaeolithic

site in this region. The region has several foothills of the same rock formation.

The present exploration revealed two cist burials, one disturbed and another intact. The cist burial that was disturbed was made of five large orthostats of gneissic rock slabs placed in the northeast and southwest directions. The length and breadth of the large slab was found to be 9 ft by 7 ft and the other slabs, 5 ft by 7 ft with an average thickness of 12 cm.

At the southern end of the cist, instead of placing a slab with a port-hole, four small steps built of flat stone pieces descend into the cist. This is the first time that such a feature has been noticed among cist burials in Kerala. Absence of port-hole is also noteworthy. The large capstone of the exposed burial was found missing. The second cist has a capstone over it. This undisturbed burial is suitable for archaeological excavation.



Fig. 1: Map showing the explored sites of south Kerala

THE INDIAN ARCHAEOLOGICAL SOCIETY
BALANCE SHEET AS ON 31.03.2005

LIABILITIES	AMOUNT (RS.)	ASSETS	AMOUNT (RS.)
Capital Fund		Fixed Assets	
Op. Balance	1898308.90	(As per Annexure 'A' Attached)	14,572,152.00
Add: L.M. Fees	76000.00	(As per Annexure 'B' Attached)	462,864.00
Add: Ex. of Inc. over Exp.	12503.95		
	<u>1,986,812.85</u>		
Building Fund	8,858,263.00		
Corpus Fund	1,688,000.00	Current Assets and Investments	
Other Funds/Donations	666,908.00	Fixed Deposit	1,509,105.00
Project Fund		Govt. of India 8% Bonds	1,000,000.00
(As per Annexure attached)	202,077.80	D.G.A.S.I. - Security Deposit-Kamrej	10,000.00
Securities		BSPS Rajdhani Power Ltd.(Deposit)	86,886.00
(As per list attached)	519,925.00	Tax Deducted at Source	101,492.00
Secured Loan		Receivables and Advances	
State Bank of India	1350000.00	(As per list attached)	396,168.27
Add: Interest	170764.08		
Less: Paid	150000.00		
	<u>1,370,764.08</u>		
Loans & Advances		Cash & Bank Balance	
Dr. S.P.Gupta - Loan	400,000.00	S.B.I. - S.B.A/c 45062	125,683.75
Akhil Bhartiya Jihva Sankalan Yojna	450,000.00	S.B.I. - S.B.A/c 45082	2,508.00
Bharat Sanskriti Parishad	1,500,000.00	Indian Bank - S.B. A/c 460017	222,352.75
Payables		Cash in Hand	24,937.18
(As per list attached)	871,398.29		
	<u>18,514,149.02</u>		<u>18,514,149.02</u>

Sd/-
(General Secretary)

Sd/-
(Treasurer)

In terms of our Audit Report of even date attached
for RAJAN SHARMA & ASSOCIATES
CHARTERED ACCOUNTANTS

Sd/-
(Rajan Kumar Sharma)
Prop., M. No.84457

Place :- New Delhi
Dated :- 21.10.2006

THE INDIAN ARCHAEOLOGICAL SOCIETY
INCOME & EXPENDITURE ACCOUNT FOR THE YEAR END 31.03.2006

PARTICULARS	AMOUNTS (RS.)	PARTICULARS	AMOUNTS (RS.)
To Salary	631,300.00	By Grant for Publication-ASI	25,000.00
To Car Insurance	9,219.00	By Grant for Publication-ICHR	50,000.00
To Telephone Expenses	33,745.00	By Grant for Conference-M/o Culture	75,000.00
To Conveyance & Travelling	13,976.00	By Grant for Conference-ICHR	60,000.00
To Printing & Stationery	33,128.00	By Interest Received	327,190.28
To Electricity & Water Charges	464,395.00	By Rent	2,022,486.00
To Establishment Expenses	2,982.00	By Sale of Publication	205,850.00
To Conference Expenses	196,500.00	By Electricity Charges. Rece.	77,823.00
To Exploration Expenses	62,528.00	By Water Charges	171,936.00
To Repairs & Maintenance	224,412.00	By Generator Charges	53,630.00
To Car Running & Maintenance	110,041.00	By Miscellaneous Receipts	2,565.75
To Municipal Taxes	276,773.00	By Donation	22,000.00
To Postage, Courier & Stamps Chg.	45,342.00		
To Internet Charges	17,162.00		
To Generator Running & Maint.	61,453.00		
To Bank Charges	3,811.00		
To Typing & Xeroxing	5,905.00		
To Library Expenses	9,450.00		
To Medical Expenses	1,959.00		
To Fellowship Expenses	32,000.00		
To Lecture Expenses	1,276.00		
To Diwali Expenses	2,150.00		
To Board Meeting Exp.	4,544.00		
To Interest on Loan	170,764.08		
To Legal Expenses	1,016.00		
To Office Expenses	2,336.00		
To News Paper & Periodicals	1,795.00		
To Ground Rent-D.D.A.	57,500.00		
To Photo Material & Film Dev.	8,770.00		
To Professional Charges	15,000.00		
To Publication Expenses	445,553.00		
To Watch & Ward Expenses	22,500.00		
To Audit Fees	26,000.00		
To Miscellaneous Expenses	796.00		
To Depreciation	84,896.00		
To Excess of Income over Exp.	12,503.95		
	3,093,481.03		3,093,481.03

Sd/-
(General Secretary)

Sd/-
(Treasurer)

In terms of our Audit Report of even date attached.
for RAJAN SHARMA & ASSOCIATES
CHARTERED ACCOUNTANTS

Place :- New Delhi
Dated :- 21.10.2006

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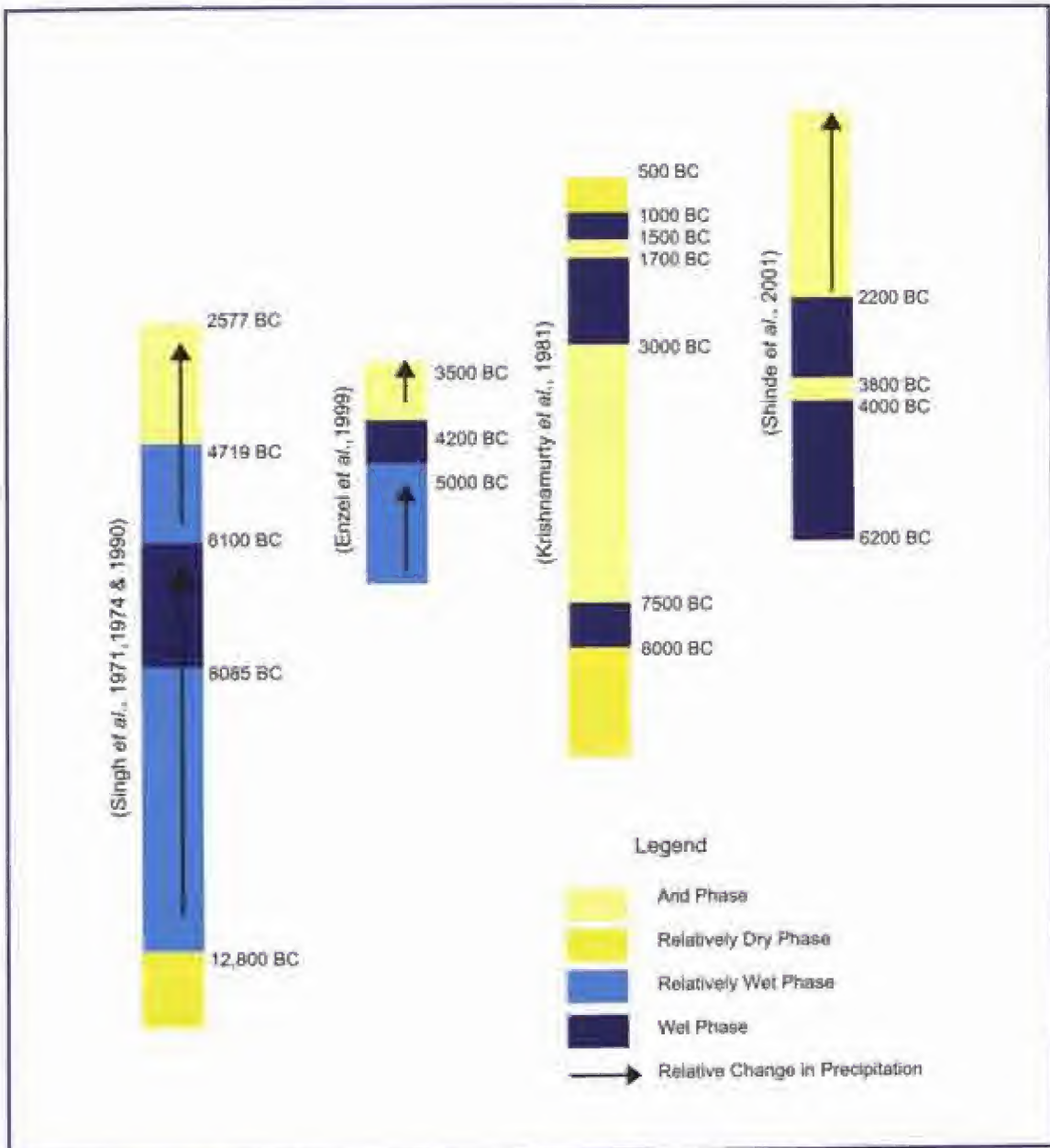
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Email: ias_newdelhi@yahoo.co.uk S.P. Gupta 65488931(R) K.N. Dikshit 26948971(R)



Deshpande, Gujarat, Pl. 1: Climate-change chart; differing views



Jayaswal and Kumar, Ramnagar, Pl. 5: Moulded terracotta figure. Buddhist, Gupta Period



Jayaswal and Kumar, Ramnagar, Pl. 6: Beads of stones



Jayaswal and Kumar, Ramnagar, Pl. 7: Pottery and stone discs



Jayaswal and Kumar, Ramnagar, Pl. 8 : Mini clay boat



Jayaswal and Kumar, Ramnagar, Pl. 9: Sealing with Kushana Brahmi inscription



Jayaswal and Kumar, Ramnagar, Pl. 11: Terracotta Plaque, Kushana Period



Jayaswal and Kumar, Ramnagar, Pl. 10 : Iron objects (Period II)



Jayaswal and Kumar, Ramnagar, Pl. 12: Copper plate



Rao *et al.*, Bhirrana, Pl. 1: General view of trenches showing cultural sequence- view from south-west

Rao *et al.*, Bhirrana, Pl. 2: Mother Goddess figurines



Rao *et al.*, Bhirrana, Pl. 3: Early Mature Harappan pot with beads of steatite, etc.





Rao *et al.*, Bhirrana, Pl. 4: A Mature Harappan period street- view from north-east



Rao *et al.*, Bhirrana, Pl. 5: Mature Harappan painted pottery



Rao *et al.*, Bhirrana, Pl. 6: Mature Harappan painted pottery



Rao *et al.*, Bhirrana, Pl. 7: Beads of semi-precious stones



Rao *et al.*, Bhirrana, Pl. 9: Terracotta animal figurines



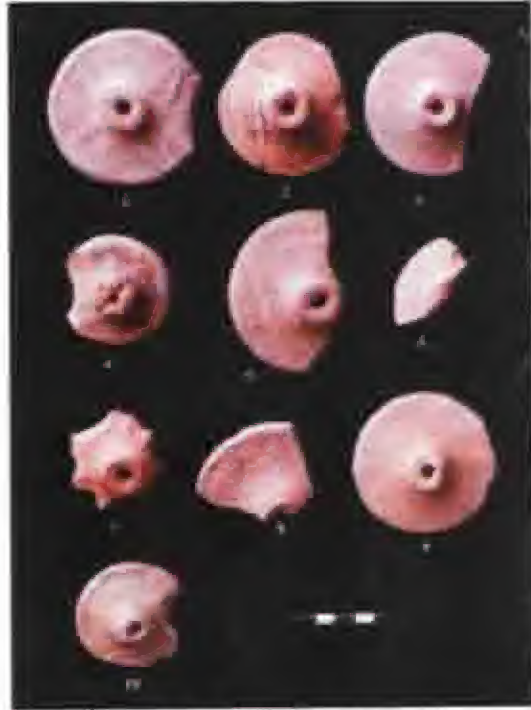
Rao *et al.*, Bhirrana, Pl. 8: Chert blades



Rao *et al.*, Bhirrana, Pl. 10: Terracotta pestles



Rao, Bhirrana, Pl. 1: Terracotta toy wheels with painted spokes (1 Early Mature Harappan Period; 2-14 Mature Harappan Period)



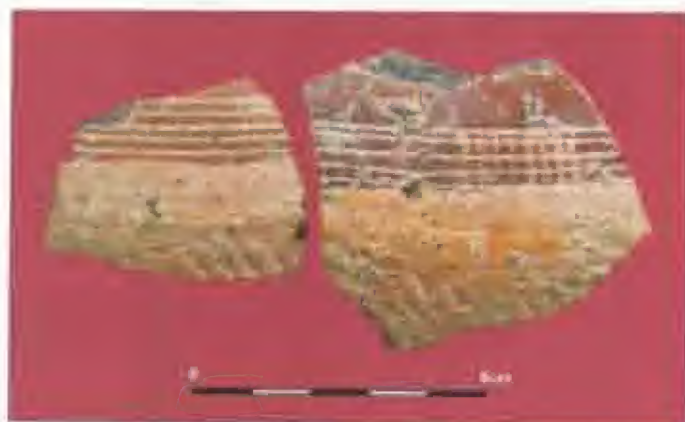
Rao, Bhirrana, Pl. 2: Painted solid terracotta toy wheels of Mature Harappan Period



Rao, Bhirrana, Pl. 3: Inner face of painted spoked and solid terracotta toy wheels of Mature Harappan Period



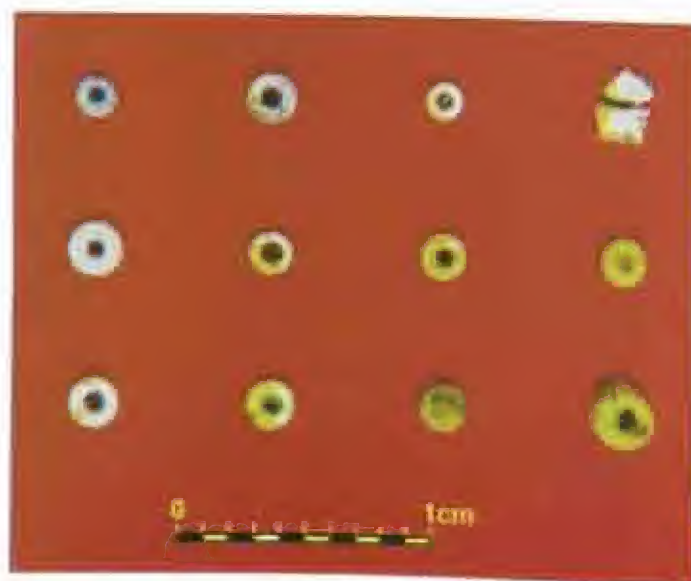
Rao, Bhirrana, Pl. 4: Terracotta toy wheels with painted spokes in low relief (1 Early Mature Harappan Period; 2-21 Mature Harappan Period)



Tiwari *et al.*, Lahuradewa, Pl. 1: Black-and-Red Ware (sub-period 1A)



Tiwari *et al.*, Lahuradewa, Pl. 2: Charred rice grains (sub-period 1A)



Tiwari *et al.*, Lahuradewa, Pl. 3: Steatite beads (sub-period 1A)



Tiwari *et al.*, Lahuradewa, Pl. 4: Copper arrowhead (sub-period IB)



Tiwari *et al.*, Lahuradewa, Pl. 5: Charred grains, rice (sub-period IB)



Tiwari *et al.*, Lahuradewa, Pl. 6: Charred grain, barley (sub-period IB)



Tiwari *et al.*, Lahuradewa, Pl. 7: Stone celts, Periods II, III



Mishra and Arora, Abhaipur, Pl. 1:
Stratigraphy of Trench E-3

Mishra and Arora, Abhaipur, Pl. 2:
Bone projectile points



Mishra and Arora, Abhaipur, Pl. 3:
Trench AX13 showing the child burial



Mishra and Arora, Abhaipur, Pl. 4: Close view of child burial

Mishra and Arora, Abhaipur, Pl. 5:
Teeth recovered from the child burial



Mishra and Arora, Abhaipur, Pl. 6: Another view of the child burial (Trenches E-3 and E-4)



Mishra and Arora, Abhaipur, Pl. 7:
Ghata-shaped beads (PGW Period)

Mishra and Arora, Abhaipur, Pl. 8:
Glass bangles



Mishra and Arora, Abhaipur, Pl. 9:
Brick-well in Trench AX9



Jayaswal and Kumar, Ramnagar, Pl. 1: Stratigraphy of Trench A1



Jayaswal and Kumar, Ramnagar, Pl. 2: Ceramics



Jayaswal and Kumar, Ramnagar, Pl. 3: Remains of bead-making activity



Jayaswal and Kumar, Ramnagar, Pl. 4: Potsherds of Northern Black Polished Ware



Deshpande, Gujarat, PL 2: Mesolithic pottery from Bagor (Above); Pre-Prabhas Ware (Below)



A



B



C



D

Deshpande, Gujarat, Pl. 3: Gritty Red Ware (A & B), Padri Ware (C & D)



Jayaswal and Kumar, Ramnagar, Pl. 13: Terracotta and stone artefacts



Jayaswal and Kumar, Ramnagar, Pl. 14: Painted pottery



Jayaswal and Kumar, Ramnagar, Pl. 15: Rammed floor



Jayaswal and Kumar, Ramnagar, Pl. 16: Stratigraphy of Trench C 3



Tripathi and Upadhyay, Anai, Pl. 1: Glass bangles (Period III)



Tripathi and Upadhyay, Anai, Pl. 2: Pottery (Period III)



Tripathi and Upadhyay, Anai, Pl. 3: Vessels found in large quantity in a pit (Period III)



4a



4b



4c



4d

Tripaṭhi and Upadhyay, *Anai*, Pl. 4a-4d : Stone sculptures-Early Medieval period



Kanungo, Kopia, Pl. 1: Trenches showing glass-making areas



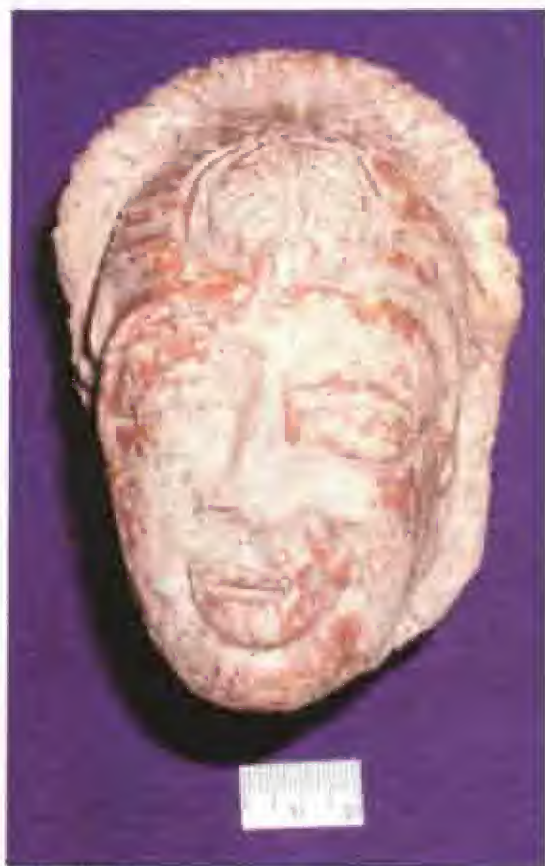
Kanungo, Kopia, Pl. 2: Water tank in Trench AVX32



Kanungo, Kopia, Pl. 3: Tuyer from Trench AWX32



Kanungo, Kopia, Pl. 4: Glass furnace in Trench AWX32



Kanungo, Kopia, Pl. 5: Terracotta female figurine, Kushana Period



Kanungo, Kopia, Pl. 6: Joint copper wristlet and bracelet



Kanungo, Kopia, Pl. 8: Terracotta rattle-head



Kanungo, Kopia, Pl. 7: Glass beads



Vijayakumar, Madarpur, Pl. 1: The speckled anthropomorphs (Excavator D.V. Sharma; Photo Courtesy: D.P. Sharma)



Rajendran and Divya, Vembayam, Pl.1: Neolithic axe



Chattopadhyay *et al.*, Mangalkote, Pl. 1: Spouted vessel from period VI at Mangalkote (Courtesy: Deptt. of Archaeology, University of Calcutta)

Chattopadhyay *et al.*, Kolubaridanga, Pl. 2: Terracotta human head *in situ* from layer (3) at Kolubaridanga (Courtesy: Deptt. of Archaeology, University of Calcutta)



Chattopadhyay *et al.*, Beladihi, Pl. 3: Stone image of Jain deity Santinatha



Biswas, Kalana, Pl. 1: General View of Rajbati temple complex



Biswas, Kalana, Pl. 2: General View of Lalji temple

Biswas, Kalana, Pl. 3: General View of Rupeswar temple



Biswas, Kalana, Pl. 4: General View of Pratapeswar temple





Biswas, Kalana, Pl. 5: Facade of Pratapeswar temple



Biswas, Kalana, Pl. 6: Details of Pratapeswar temple, terracotta



Biswas, Kalana, Pl. 7: Details of Pratapeswar temple, terracotta



Biswas, Kalana, Pl. 8: General view of 108 Shiva temple



Sathe, Pl. 1: An example of Enamel dysplasia in recent captive, aged Asian female elephant: Impacted mandibular dentition showing right 6th molar being inclined obliquely to the mesio-distal axis of the tooth. This is a confirmed case of Enamel Dysplasia due to the absence of synchronisation between the rate of abrasion verses tooth loss (of 5th in-use molar) and the rate of eruption of the 6th molar (reproduced with permission from the web site of The Colyer Institute, San Diego, California, U.S.A.).



Sathe, Pl. 2: Occlusal view of the fossil tooth of *Elephas planifrons*, showing Enamel Dysplasia and malformation of lamellae. The abnormal swelling coupled with dilaceration of enamel plates confirms a brief retarded period of abrasion and tooth loss of "in-use" tooth, this specimen was following.



Sathe, Pl. 3: Matrix embedded cervid jaws showing well preserved crown, especially of right jaw.



Sathe, Pl. 4: Ventral view of the corpus mandible affords a clear view of deformity and fine grained matrix that has kept the mandibular symphysis intact.



Sathe, Pl. 5: Matrix embedded lower jaws of a cervid: lateral view showing a fracture in the mandibular body in addition to the deformity seen in the ascending ramus of the left jaw.



Sharma *et al.*, Sanauli, Pl. 1: General view of the excavated site



Sharma *et al.*, Sanauli, Pl. 2: An extended burial



Sharma *et al.*, Sanauli, Pl. 3: Stratigraphy of the burial site; sandy clay & silt deposits; thick central band with *Kankar* formation



Sharma *et al.*, Sanauli, Pl. 4: Double burial



Sharma *et al.*, Sanauli, Pl. 5a: Dish-on-stand in a grave



Sharma *et al.*, Sanauli, Pl. 6: Triple burial



Sharma *et al.*, Sanauli, Pl. 9: Burial with stylized copper objects arranged on a thin plate



Sharma *et al.*, Sanauli, Pl. 10: Burnt-brick wall demarcating a grave



Sharma *et al.*, Sanauli, Pl. 25: Modern memorial, *Pitresthana* (Villagers come here to make offerings to their departed forefathers; evidence of continuity of Harappan tradition)



Sharma *et al.*, Sanauli, Pl. 11: Symbolic burial with a copper shrauth placed on a thin plate bearing a decoration of steatite pieces



Sharma *et al.*, Sanauli, Pl. 22 a,b,c: *Staurolite* and *faience* beads



Sharma *et al.*, Sanauli, Pl. 16: Glass beads



Sharma *et al.*, Sanauli, Pl. 22 (d) Agate pendant and (e): Beads of Semi-precious stones



Sharma *et al.*, Sanauli, Pl. 23: Long carnelian beads



Sharma *et al.*, Sanauli, Pl. 12: Gold star-shaped piece, and Pl. 15: Gold cup



Sharma *et al.*, Sanauli, Pl. 5b: Dish-on-stand with drooping sides



Sharma *et al.*, Sanauli, Pl. 19 a & b: Pottery vase and bowl



Sharma *et al.*, Sanauli, Pl. 21: Potsherd with Harappan character in graffiti, and Pl. 20a: Painted pottery



Sharma *et al.*, Sanauli, Pl. 18: Terracotta animal figurines: (a) dog, (b) bull, (c) bull with rider



Sharma *et al.*, Sanauli, Pl. 7a & 7b: Urn burials



Sharma *et al.*, Sanauli, Pl. 13: Burial with gold ornaments



Sharma *et al.*, Sanauli, Pl. 14: Clay trough cutting an earlier burial



Sharma *et al.*, Sanauli, Pl. 17: Chamber-burial (*Bhumigriha*)



Sharma *et al.*, Sanauli, Pl. 8: Burial with copper antennae sword (background) and sheath (foreground)



Sharma *et al.*, Sanauli, Pl. 20b: Painted pot in a grave



Sharma *et al.*, Sanauli, Pl. 24: Charred grains



Agarwal and Pathak, Rajasthan, PL 1: Colours of faces and body have changed to black in wall painting



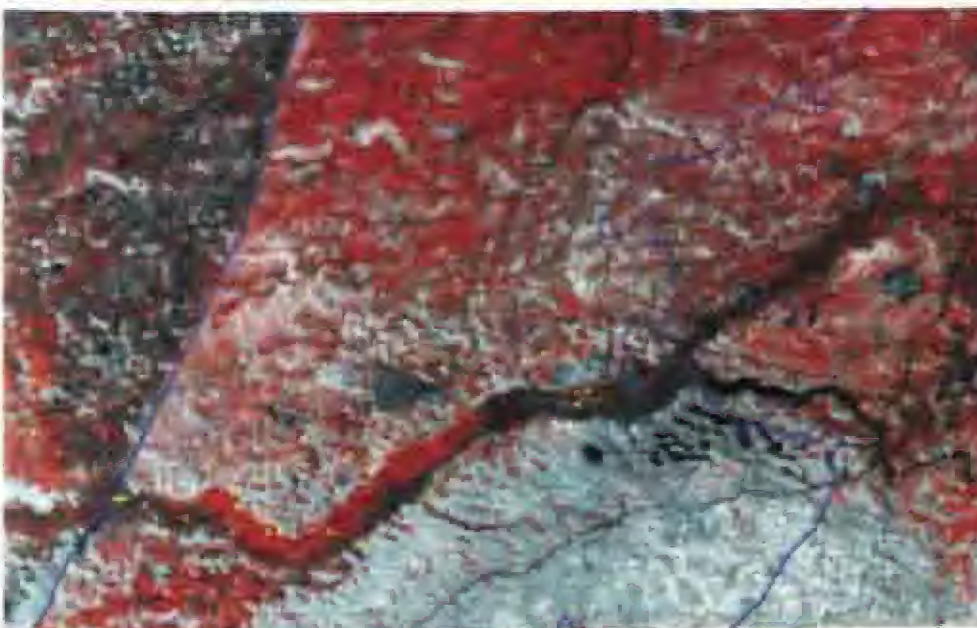
Agarwal and Pathak, Rajasthan, PL 2: Example of a painting in miniature style on a wall



Agarwal and Pathak, Rajasthan, PL 3: Red and pink faces have changed to black in wall painting



Sharma, J.R. *et al.*, Pl. 1: IRS P3 WiFS true color composite(TCC) image showing palaeo drainage in Saraswati river basin. Thick channels represent the course of river Saraswati



Sharma, J.R. *et al.*, Pl. 2: IRS 1C WiFS image of part of Saraswati river basin with archaeological sites of Early Harappan and Mature Harappan periods, plotted over it. Sites show alignment along river Ghaggar



Pandey and Ambekar, Goa, PL1: Prehistoric Cupules in linear pattern



Pandey and Ambekar, Goa, PL2: Interconnected grooves



Pandey and Ambekar, Goa, PL3: Footmarks (four pairs)



Pandey and Ambekar, Goa, PL4: Cupules, linear pattern



a) Silver bracelets with ram design;
Scythian art



b) Silver bracelets with
ram design



c) Silver bracelet



d) Gold bracelet with griffin design



e) Silver bracelet with ibex design



f) Modern gold bracelet with elephant
design, Kolkata



g) Modern silver bracelet with lion
design, Rajasthan



h) Modern shell bangle with metal
elephant design, Kolkata



i) Modern copper bangle with animal
motif, Udaipur



Raut Dey, Hazaribagh, Pl.1: Jumping deer, Prehistoric Rock painting



Raut Dey, Hazaribagh, Pl.2: Charging bison, Rock art



Raut Dey, Hazaribagh, Pl.3: Deer with a wheel, Rock art



Raut Dey, Hazaribagh, Pl.4: Cattle, Rock painting



Raut Dey, Hazaribagh, Pl.5: Humped animal, Rock art



Raut Dey, Hazaribagh, Pl.6: Flock of deer, Rock art



Raut Dey, Hazaribagh, Pl.7: Bull, Rock art



Dhaka, Alwar, Pl.1: Copper bar celts (1-5), flat celt (6);
Dantia Copper Hoard



Dhaka, Alwar, Pl.2: Copper chisel (7), nail (8), bangles
(9-12); Dantia Copper Hoard



Dhaka, Tonk, Pl.3: Copper bar celts (1-6);
Sakatapura Copper Hoard



Dhaka, Tonk, Pl.4: Copper flat celts (7-9), crowbar
(10); Sakatapura Copper Hoard





Sanauli: Contemporary memorials for forefathers (pitra-*sthan*)



Burial with animal sacrifice



Clay trough



Faience beads on a copper ring round a crutch



Symbolic burial with a copper sheath and offering pots

[The following section contains faint, illegible handwritten Devanagari script.]